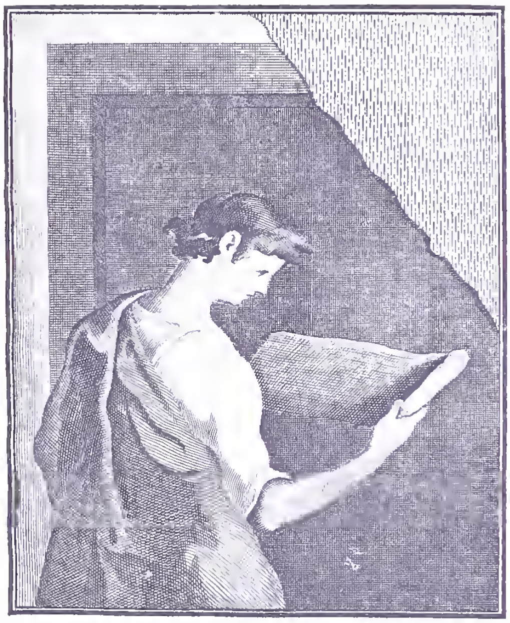

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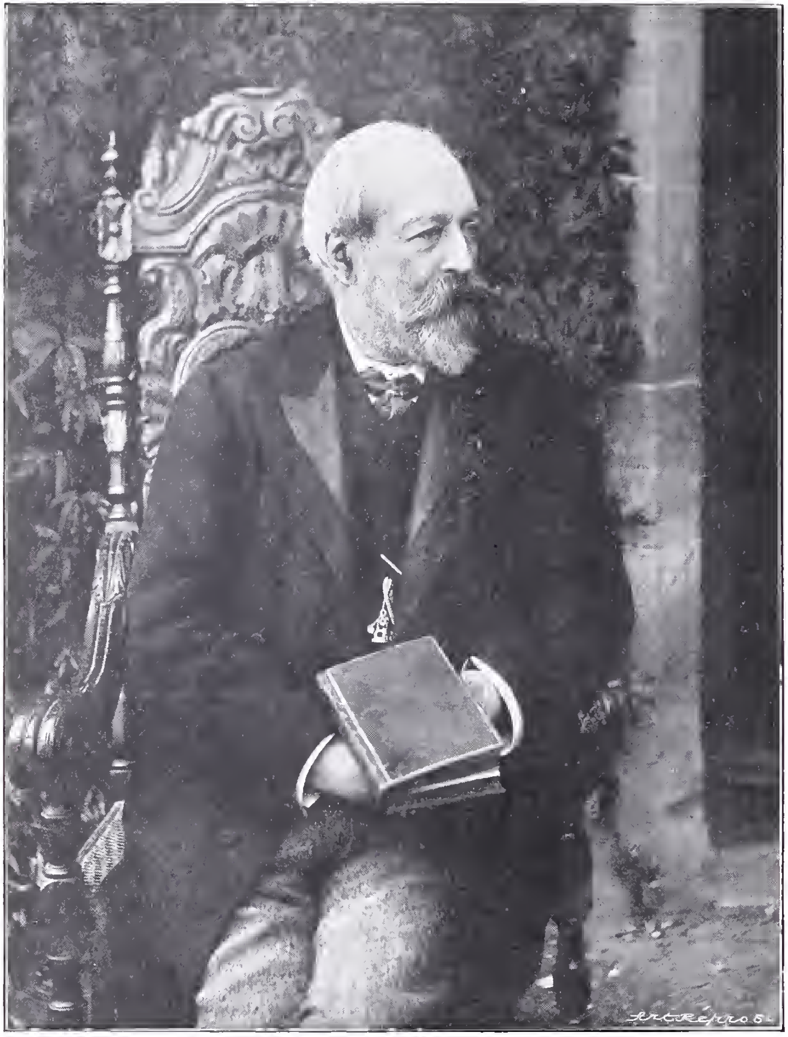

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JOURNAL

OF

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

SESSION 1898-99.

THE OPENING ADDRESS. Delivered by the President, Professor AITCHISON, R.A., at the First General Meeting, Monday, 7th November 1898.

BROTHER ARCHITECTS, LADIES AND GENTLEMEN,—

I THINK we may be congratulated on the improvement that is taking place in the appearance of London. It is a great triumph for architects to think that they are converting a rather dull city, mostly composed of brick walls with holes in them, into a town almost as picturesque and varied as the old towns of France or Flanders.

I think it was in the forties that Professor Cockerell, at the Royal Academy, gave the approximate number of the new churches and public buildings that had been erected in the preceding thirty years; but that list, astonishing as it was, would dwindle into insignificance beside the new buildings that have been erected in and around London within the same lapse of time.

Of very important buildings in the centre of London there have necessarily not been very many, but in the outskirts numberless town halls, technical schools, and other municipal buildings have sprung into existence; and, though I am afraid we can hardly claim for most of them that they have rivalled the picked examples of the world's architecture, they mostly have some stateliness, picturesqueness, or originality.

I regretted to read the remarks of Mr. Norman Shaw, who has been acting as one of the assessors on the designs for the buildings of the Californian University. He said that "The competition had been held in the hopes of discovering some architectural genius, but in this it had failed," and he felt "a twinge of national regret when no English name appeared among the selected eleven;" the plans selected were without exception of the French school. "Architecture," said Mr. Shaw, "is more thoroughly taught in France than in England;" "at the same time French teaching destroys individuality." It is a matter for regret that an English-speaking race should have to go to our neighbours for their architecture, but that may be because there is more architectural genius among our neighbours across the Channel than amongst the English-speaking countries on both sides of the Atlantic and in the Pacific; yet it is peculiarly unpleasant that a celebrated English architect can justly speak of a more thorough teaching being given in France. One naturally asks, Why is this? For one would think that what is teachable could and ought to be as well taught in England, America, and Australia as it is in France; at any rate, the first thing that the English architects should do is to see that this inefficiency is corrected. I can hardly believe that teaching, if not carried far enough to stifle independent thought, can extinguish individuality, for certainly some of our great poets were the best educated men of their day. As far as we know, we cannot give ourselves genius, but it is most probable that, if a large number of persons will acquire that which a good architectural education can give them, there will be a genius among them; and surely a well-taught genius is better than an ill-taught one.

There is a most interesting book written by M. Edmond Demolins, who says that the education given to the English has peculiarly fitted them to be successful colonists. Whether this method of education was deliberately chosen, or whether it was stumbled into through the natural bent of the people, does not appear; but we can only hope that, either by accident or design, we may find as successful a method of teaching architecture; for every English-speaking man in the world must wish that we could produce buildings that would vie with those produced in the most brilliant epochs of Greece and Rome, of France and Italy, and with the best Saracen buildings, and with the Gothic ones that pervaded Europe during the Middle Ages. We cannot hope, however, to equal the excellence of monuments that sprang into existence after stirring times, in nations where there was an adoration of the beautiful, particularly when one of these nations is believed by some philosophers to have possessed faculties as superior to those of the nations of Europe as the faculties of European nations are superior to those of the negro.

Architecture is the poetry of construction, and the noblest poetry is naturally found in buildings that are applied to the highest transcendental uses. A certain amount of comeliness is necessary to every building, except such buildings as are required to create fear, horror, or a sense of ignominy, such as fortresses, gaols, gallows, and pillories.

A building is an organism created by man for his own needs that should emulate the organisms of nature. To take man as the highest organism, we may say that the man of the most striking appearance is not a perfect organism if he has some incurable internal defect; and so in a building no beauty will wholly compensate for its want of answering the purpose for which it was built, and even if it answer its purpose, but has a beauty that is quite incongruous with its use, it becomes as ridiculous in the eyes of judges as a man in a State dress acting as a scavenger. In some of the modern buildings that at first sight affect us strongly, from their size, mass, or ornamentation, if we see that this size and this massiveness are not necessary, that these embellishments are not consistent with the uses of the building, we merely despise the factitious effects.

As our knowledge of the strength of materials, of the strains and stresses that result from the different forms of buildings becomes more accurate, it will naturally affect the shapes of the different parts of the building, and I think we must look very much to this for future advancement in architecture.

We want to mark those portions of buildings that have special duties to perform with that architectural emphasis which is given by mouldings, and these mouldings have to produce the effect we want in our own climate. To use mouldings that were designed for climates different from our own, and consequently do not properly answer their purpose, is really to declare ourselves indolent or incompetent; we have plenty of plausible excuses, *e.g.* that the Romans used the same mouldings whenever they built, and that their Renaissance imitators did the same, and that the archæologists our masters would be shocked at any architect who attempted to think; but neither excuses nor bad examples will avail us, if our sole object is to advance our art. We have too to consider the purposes to which our buildings are to be put, the ratio of strength we must allow when a building is merely for a temporary purpose, or to last as a record for future ages.

According to the uses which the building is to subserve we must consider the ornaments that are to be given to it by the sculptor, and whether their forms are to be taken from vegetable life only, or are to include animals or man. Where buildings are to be used for the highest intellectual or moral ends it is perhaps difficult to find even figure sculpture that will sufficiently express their high use. In classic and mediæval times, at least, sculptors employed for this purpose mythical or symbolic figures. In the present day we have given up almost all symbolic and emblematic forms, and have trusted purely to words, which do not strike the multitude, and have not, in the bare form in which they are mostly given, the same effect on the mind as symbolic forms. Sculpture is wanted on all buildings, but its use should be imperatively called for by the people for all public buildings, for the sculpture, if properly designed, would more completely show the use of the building, and surely the public who pays for these buildings should be informed of their use; this is particularly called for when the buildings are for benevolent purposes, such as hospitals, asylums, workhouses, rests, refuges, and homes. The speaking arts of sculpture and painting are particularly wanted for enlightening the people on the advantages of living in a free and advancing country. It is for statesmen to consider how much more contented the population of this country would be if the fine arts were used to proclaim the advantages the people enjoyed.

The subject of colour is one that has of late years fallen greatly into neglect, but, as far as I can comprehend, very unnecessarily; for as Nature colours all her works, and produces every sort of emotion from the combination of form, light and shade, and colour, it can hardly be inappropriate for man to do the same; and all architects know that monumental colouring may be as well marked as monumental form.

Hitherto the proportions used, or, as the ancients more properly called them, symmetry, which forms so important an element in architecture, has been almost confined to those taken from the highest transcendental buildings of the past; but we see in Nature every conceivable proportion, and most of these are good; consequently it is only from want of observation and want of skill that we confine ourselves to the proportions of Greek, Roman, or Mediæval work; for Egyptian, Assyrian, Arabic, or Indian architecture has found no great favour in Europe.

The thing we want most is the Advancement of Architecture; but who is to show us the way? A deceased architect of marked ability said we must wait for another irruption of barbarians—and probably if they were barbarians of improvable quality they might solve the problem; but it would be a drastic measure that most of us at least would pray might not occur in our time. I think the greatest obstacle to the Advancement of Architecture is the fact that the bulk of Englishmen do not care about it in the least, and, as far as I can judge, the fine arts are not likely to improve if no one cares for them. So every architect should be ready to point out what architecture does for a nation, and thus help to create the want.

Architecture—and by that I mean good architecture—must, even from the size and importance of its monuments, create some sort of emotion in the beholder; and the least reflection should show him the vast army of various men that have been employed to get all the materials and to bring them together, the thousands of craftsmen wanted to fashion them and put them in their places; and according to the stateliness, the impressiveness, or the beauty of these buildings will the power, wealth, and grandeur of the nation that has erected them be brought before his mind. If these buildings are for the highest purposes and clearly express their character, deep emotion will be excited in him, and he will also think of the science that these buildings presuppose, the artistic skill of the architect and artists employed, and of the artistic tastes of the nation at the time in which they were built. As the late Charles Garnier said, "Architecture is an obtrusive art." Its masterpieces thrust themselves upon you and cannot be hid in a corner, and as long as they remain they call from the people who wish to see them a journey to the land of their creation; so if we want a good account of our time to be given to posterity, we must pick out good architects, encourage them to do their best in erecting important, well built, and æsthetic structures; at any rate, if this is neglected the age in which we live will be lampooned.

The painters and sculptors laugh at us when we say we want the public to show us what they like and what they want, and say, "We struck out a new type of woman never before painted, and new methods of treatment, and the public appreciated it and asked for more." But their case is quite different from ours. It is not pleasant, I confess, for a painter to paint a picture or a sculptor to model a statue that does not sell, but an architect cannot put up a monumental building in the hope that the public will approve of it and pay the expense. The most he can do is to show a drawing or a model in public, and persuade men in power or of immense wealth that he is both capable and original, and will be able to charm the public by his work. How did the architect of the Erectheum persuade the State to employ him? So small a monument as that of Lysikrates could well have been shown by a model.

To get the proper teaching is not so easy as to say we want it; but I think in architectural education, as in general education, we must endeavour not to teach that which is dead nor that which is useless, but confine ourselves to the necessary and the useful. I think it is obvious that architecture is the poetry of construction, and consequently the very first thing to be taught is construction; and it is not the mere rough knowledge of the main principles, but that exact and accurate knowledge which was possessed by the late Romanesque architects of the properties of stone. They got this knowledge mostly by the failure of their buildings; but they reasoned on the causes of the failure; they observed, they thought, and they dared; while we have most accurate means of testing the strength of every material that falls to our hand, and if we be mathematicians we can solve every stress and strain, as the engineers have done. We have many new materials that our predecessors had not, and some of extraordinary strength and of a capacity for taking nearly every form with ease; I speak here particularly of cast iron. This is not without dangerous qualities when exposed to fire, but we ought not on that account to neglect it. With wrought iron we have other difficulties to contend with, besides the danger of fire, for it is very difficult, and still more expensive, to make this in any agreeable or beautiful shape, and to ornament it; but we cannot believe that the mediæval architects would not have largely used both materials if they had possessed them. We have, too, practically a new material in concrete, but this material also is not without its difficulties and its drawbacks, and we have besides the whole of what I may call old-world materials to our hand to deal with structurally in a more perfect way than they ever could have been dealt with before, and the whole category of old shapes to use and new forms to adopt that have never been used before. If the dictum of Sir Joshua Reynolds be true, that by becoming familiar with the invention of others we learn to invent, the great knowledge that we possess of past architecture should make us more ready to invent; but in fact, the gift of invention, so far as architectural forms are concerned, seems almost extinct. We have only this to say in excuse, that from the fifteenth century to the middle of the last century, European architects had nothing but Roman architecture, or its Renaissance imitation, to study and to use; since then we have had Greek and Gothic. Neither of these styles, however, was used to stimulate invention, but merely to copy, and even in the present day it is doubtful whether the invention of a new form, unless it were surpassingly beautiful, would be tolerated, for antiquarianism has usurped the place of architecture.

We must of course study the expressive and beautiful buildings of the past to learn how their effects were produced; but, having learnt this, our object should be to invent other proportions and other shapes, whose effects shall be equal or superior to those of the past: and when I speak of invention it is merely the adaptation of some of the innumerable forms of nature. In the present day we should say that there was even less invention amongst architects than there was amongst the Romans, for the Romans at least started a new method of adornment when they carved the shafts of their columns, or covered their pilasters with running foliage; but of course it is to the Gothic architects that we must look for those rapid adaptations that we now call inventions. Gothic architecture from the time that it emerged from Romanesque passed rapidly through what we call Geometrical and Decorated, till it fell into the mechanical stiffness of Perpendicular. Were these men blessed with greater powers of invention or adaptation than we are? or is it that the gift has become atrophied for want of use? At any rate, the substitution of archæology for architecture must tend to this result, for if the wing of the apteryx dwindled to the size of your thumbnail for want of use, it is probable that our powers of invention will do the same. I think that we are not so destitute of invention as we appear to be, for in out-of-the-way places in the country you see the elements of new Gothic and new Classic, where the architects have not been very learned, and have not had the fear of the archæologist before their eyes.

When one speaks of invention, good invention is meant, and if we have the gift of invention it is only by the constant exercise of it, and by comparing our inventions with the excellence of the past, that we are likely to progress. I feel sure that the architecture of one century, or perhaps even of one quarter of a century, should not exactly resemble that which went before it, for besides our proclivities and aspirations not being exactly those of our fathers' time, if our knowledge and invention were progressive we should want the one for use and the other for emulation. In poetry we do not want the poets of our own time to portray again the character of times long past, for in that we can take but small interest; but to portray our advancing knowledge and the good, striking, and dramatic characteristics of our own time, as Tennyson so admirably did; and we must never forget the labour and study he undertook to perfect himself, for he learnt Hebrew to see how the Hebrew poets arrived at sublimity. I do not speak about ornament, whether carved or painted, for that is the business of the sculptor or the painter. I by no means wish to discourage architects from being painters, sculptors, and ornamentalists, so long as they are good architects as well; but it is absurd to give up the advancement of our own art for the sake of being dabblers in the arts of others. I have said nothing about the art of planning, although that is a most important art, and in these days, where convenience is thought of more importance than anything else, it is the art by which most competitions are gained. No one can deny that it is a useful art, and may be a very impressive one, and I am sorry to say that in its highest form it is not sufficiently studied.

I must say something on the results of our own Examinations, for they have had a very stimulating effect on the students. The Examinations let the students know some of the things they ought to study, and give them an object to aim at. Examinations, however, have certain shortcomings, like everything human—they test insufficiently. Besides, a parasitic growth clings to them: they lend themselves to cramming, whilst to cram is the last thing we should wish any architectural student to do, for it is a pure effort of memory to recollect what has been before written or said and repeat it at a given time, while the great object of instruction is to teach people to think and act properly. The sort of memory architects want is for the thing to be remembered to be firmly and permanently fixed; while anything crammed, when it has once answered its purpose, is almost immediately forgotten, and leaves scarcely a trace behind. Architecture in every one of its three branches requires accurate thinking to the end in view, and no cramming is of the slightest use in that direction. The only use I ever heard claimed for it is that it enables a man to seem to know that which he does not know—which may be useful on occasions.

The plan or arrangement of a building requires to be made perfectly suitable for its purpose, and in the cases where the building is not for common use it should have a certain effect, and if for high purposes the forms require to evoke feelings of dignity, stateliness, sublimity, or awe. I cannot refer to more perfect examples than the Parthenon and the inside of the Pantheon. Plans embody not only the general conception of the building and its supports, but should roughly inform a skilled person of the whole scheme of the completed building. We judge of the constructional skill of the architect by the smallness of the ratio of supports to the total enclosed area.

Every one of the three branches of architecture is not only sufficiently difficult, but may be considered transcendental. When we look through many plans we see that some are not only more convenient and more striking than others, but sometimes it seems as if the great planner were first and the rest nowhere. As buildings are meant to stand, it has always struck me as rather a paltry trick to arrest attention, to make a building look unsafe, or to put in a piece of construction which forces us to ask how the architect has managed to make it stand. We want everything to look stable, so that our whole attention may be given to the æsthetic effect; but at the same time skill in construction will enable us to give great variety in the different parts of the building, some parts being slight or slender as compared with the important members of support, which must necessarily be bulky. No building should be put up that has not some evidence of the intention to make it comely, unless it be those buildings that are intended to convey horror or antipathy, of which I spoke before. Every building wants character, and that character should show its use; and when buildings are for the purposes of dignity, reverence, or awe, it is most important that their proportions should excite these feelings, and that any sculpture or painting that is put on them should heighten their effect in the same direction. Although it may seem a paradox to say so, the special convenience that should attach to every building is not so important in the highest sort of monuments, as for the monument to excite a feeling of sublimity, and for this reason that high thought clothed with beauty is much more lasting than ordinary wants. If we could call to life the High Priest of the Parthenon he might tell us that Iktinus and Kalikrates made the temple very inconvenient for the service, but for more than fifteen hundred years that service has been abolished, and we are still enamoured of the sublimity of the temple.

The principal things that want teaching when construction and the art of planning have been mastered are the proportions that have raised the various emotions in existing buildings, the art of moulding and the exercise of the inventive faculties, for it is doubtful if invention is denied to any average human being, although some have it in such profusion that it is easy for them to invent. You probably recollect Plato's saying that those entrusted with public duties should find them easy. I have so often said before, that construction should be the best that is known and practised, and that any construction that is used merely because it is old is mere pedantry.

In every new building we arrange, difficulties arise in giving to the necessary parts that æsthetic expression which we wish them to have. It is comparatively easy to mask the construction so that we may use the æsthetic solutions of deceased architecture, and so long as we pursue this course architecture can never advance. What should be done is to encourage the student to solve the difficulty in his own way, and that is why ironwork is so serviceable, because in that the student has nothing to copy from, and he must use his inventive powers. Very long columns and stanchions, for instance, have junctions that must be kept together by ugly lugs and bolts or some other cumbrous addition, and these have to be made graceful or beautified. There are difficulties about moulding in iron, and in trying to solve these difficult problems the student should be recommended to aim at simplicity and elegance. If after many trials he cannot do anything towards a solution of these problems, he should abandon architecture.

As regards the practice of some of the younger members, there is too much straining after effect; too much recourse to easy means of arresting attention, such as by rustics; too much partiality for curious and incongruous forms; the sewer-arch or water-opening is too much adopted for entrance doorways and attic windows—anything for a novelty! corners of square openings are rounded off, and projecting members are slightly curved or bellied out. Now there is, in my opinion, nothing like straight lines for dignity, and the rounded corners and bellied door and window heads mostly produce meanness. Another device is to make columns like those barrels that are used to fill in the odd spaces in ships, where the middle diameter is nearly double that at the base and necking, a gross and vulgar caricature of the entasis of the Greek column. This device truly arrests attention, but only to make the judicious observer note the absence of any feeling but for vulgarity. Architecture is a very difficult fine art, and these attempts to attract attention easily merely show want of proper training and laudable ambition. Horace's maxim is as true now as it was then, that "you should study Greek examples by day and by night." The simplicity, grace, and restraint of Greek work cannot be too much studied, and that profusion of ornament that is now so common is not only opposed to Greek practice, but to good taste, for, as it has been truly observed, nothing great is obtained without simplicity.

There is one feature we want badly, and that is a well-designed large window: for there is great demand for these in the new public buildings, and we have nothing but the huge Roman semicircular window of the Baths, and the west-end perpendicular windows, which have little claim to beauty.

There is a great want of study of lighting; half the effect of large complex interiors is got by concentrated light against "a mighty contiguity of shade," while most of our buildings are spotted all over with windows. One of the architectural devices the student should study is to get harmonious grouping of immense windows with those of ordinary and small size, and another is how to treat the problem of the seventeen-story building; for though we have not yet adopted this American device, the increasing scarcity of ground and price of land in large cities tend to produce it.

The only use of these Addresses is to correct mistakes in teaching, to point out, if one can, where the defects in our practice lie, and to stimulate each other to greater exertion, and if possible to find out the way to the advance of our art. The chief things that act as incentives to mankind are the hope of wealth, the hope of honours, and the hope of immortality; and I certainly think that we might well increase one incentive by insisting on being paid for our work, for we are not paid now. I think the powers that be might well make another incentive more common by bestowing honours on the profession, which is now hardly recognised, although it does so much to raise the reputation of the nation by designing monuments which persons from all parts come to see. I can only hope that the prospects of immortality may induce those with congenial genius and the highest ambition to devote themselves to architecture, and to spare no thought and no labour in perfecting their work, so that it may vie with the best Greek work in grace, and with the Mediæval in impressiveness.

We all wish that a great architectural genius may arise, for the sake of our art and of our country; it would be good for everyone but the genius, for his highest traits are mostly brought out by misery. As Shelley says, "We learn in suffering what we teach in song."

I think, or at least hope, that with all the present teaching, striving, and devotion, we shall find the true path of progress, and that in the near future architecture may realise the transformation of the dragon-fly:—

> "To-day I saw the dragon-fly
> Come from the wells where he did lie.
>
> An inner impulse rent the veil
> Of his old husk: from head to tail
> Came out clear plates of sapphire mail.
>
> He dried his wings: like gauze they grew:
> Thro' crofts and pastures wet with dew,
> A living flash of light he flew."

VOTE OF THANKS TO THE PRESIDENT.

Colonel LENOX PRENDERGAST [*H.A.*] asked to be permitted to move a vote of thanks to the President for his most suggestive and interesting Address. He had no claim to such a duty, except that by the kindness and consideration of the Institute there was a class of members belonging to it more or less connected with the outside public, as well as with gentlemen within; and it was upon that ground he believed that it had been usual on these occasions for an Honorary Associate to move the vote of thanks to the President for his Address. His first duty was to congratulate the President upon the honours which had been showered upon him within the last year. He had not only gained the blue ribbon of the Royal Academy, but what was perhaps a more striking indication, he had been awarded the Gold Medal, and had been again elected to the Presidential Chair of the Royal Institute. Like many a great position, it was not without its drawback. At the moment of his success the President had had a Fashoda drawn across his path. He too had had to meet a Marchand, in the shape of Mr. Norman Shaw, who had come to tell English architects that they had failed to gain the Californian competition. He had often thought that on these occasions it would be very desirable if they could carry out their old national principle of taking sides in everything, and have a debate on the Address—just as in their school days they had taken sides on the cricket or football ground. He should like to hear a debate on the President's Address! There was no doubt that the suggestiveness of what they had heard that evening would give ample field for the purpose. If under such circumstances they were to enter on a debate, he himself would be found on the side of the French. He confessed he had the profoundest admiration for the system prevailing in Paris of educating the profession to which they belonged. People were always talking about originality. But what was originality worth unless they knew the science and the grammar of their calling? The greatest mischief was done by those who were telling their young men (who, of course, like all other young men, would like to shirk the difficulties of life) that they could at once start a style of their own and ignore the work of the centuries that had gone before. The public wanted educating on the subject of architecture, and that could not be done if architects were not educated themselves. To suppose that they could invent out of their own heads a new style was the strangest thing that could be imagined. Architecture *nascitur non fit*. He was convinced that anyone who told the young men now rising up that they were fit to start and lead the world to principles different from what had been done before was their greatest enemy. As he had spoken about France he would give them an instance. The French, too, had among them a clique which had started this hare of originality. A recent number of a well-known French periodical, *L'Illustration*—a very good publication in many ways—devoted three or four pages to the subject, and gave six illustrations of the coming style. Thus the most refined, the most artistic of European peoples had got this canker started amongst them. He would ask members to look at the results, to look at those pictures. Anything more ludicrous, anything more detestable it was impossible to conceive. He had jotted down three or four lines of the letterpress, thinking they might amuse members The writer charged full tilt at the architects, said they were "tied and bound in their worn-out doctrines and terribly refractory," whilst the new school are "the valiant pioneers of the ideal, who push forth manfully in the *mêlée* and produce works, original works, which prove more eloquently than words that which can be in the future and is the modern style." He hoped the Secretary would purchase a copy of *L'Illustration* of the 15th October, so that they might all have some idea to what depth of degradation a clique was trying to lead that highly refined people. The President had referred to the use of iron in construction. That was indeed a field for them to consider. In St. James's Square there is a huge building that has been rising for some eighteen months or two years. It was an object lesson for anybody to follow the construction of that building. When he saw the iron construction—and some of it was very nice—he thought that perhaps they had got something fresh, and that it was not so bad, but they proceeded to hang upon it a mere clothing of a different description. It was just fiction founded upon fact.

Professor T. ROGER SMITH [*F.*] said he rose with very great pleasure to second the vote of thanks. It had not been unusual for some member of the Institute who was not a member of Council to have the honour of doing it, and it gave him great pleasure to acknowledge, in the name of the Meeting, how very much that was suggestive and instructive the President had compressed into the short space of his Address. The phrase which more than once occurred in it, and which he had heard from the President's lips at the Royal Academy also—"The Advancement of Architecture"—was the text of that Address. His desire was to put before them the ways in which architecture might be advanced, and some of the considerations which those who endeavoured to advance it ought to keep before them. He could not help, however, after some of the hard measure that had been dealt out to novelty both by the President and by Colonel Prendergast, saying one word in favour of novelty. There could be no question that novelty was a sort of advancement—that is, if the new thing be also good, and especially if the new thing be better than what went before it. He did not believe at the present day in the possibility of a new style being invented or adopted, except at the suggestion of the new materials and the new wants which were rising; and the modes of building might be modified ultimately to a much greater extent than could be foreseen at present. But they were familiarised with the forms, their minds were filled with the knowledge, their eyes were filled with the sight, their memories were filled with the recollection of the buildings that had been erected and become prominent during all eras of that civilisation which had covered the West of Europe with buildings of different descriptions, and it was impossible for all this to be forgotten; it was impossible for architects to build without remembering it; and it was impossible for the public to admire buildings without thinking of the forms which had been wrought out with the utmost care and pains at different periods. He believed that, at any rate for some time to come, originality must mean, not new features, but new modifications of existing features, and certainly new combinations. About the new proportions which the Address suggested he himself felt a little misgiving, but the new combinations were possible, and that almost in endless variety. The words used by the President at the opening of his Address when he spoke of the transformation which had taken place in London, and the reference to the interesting buildings to be found in various parts of the country, where, as the President observed, architects were perhaps freer from the fear of the critic, showed that some such change was taking place; whilst the buildings illustrated week by week in the professional papers showed that a large amount of thought was being expended upon buildings, and considerable progress was being made. If they compared one of those journals of to-day with what it was twenty or twenty-five years ago, they would see a definite advance—a quiet advance, but an advance which they must recognise; and he felt full of hope that the future, for those who lived to see it, would show that that advance was going on. If the Institute examinations assisted in inducing men thoroughly and substantially to train themselves, that advance would be accelerated and would be a healthy one.

Mr. WILLIAM WOODWARD [*A.*] said he did not rise to commence the debate referred to by Colonel Prendergast, but merely to direct attention to what he conceived to be an important omission from the Address, and one which he was quite sure the President himself would desire to be filled. He referred to the action of the Institute in the most important architectural matter which had occurred in this generation—namely, the new Public Offices in Whitehall. The Institute was to be congratulated upon its selection; and the Government was to be congratulated upon adopting that selection; and he was sure every member of the Institute would congratulate the two gentlemen, Mr. John Brydon and Mr. William Young, who had been selected by the Government to carry out those important buildings. He was quite sure that Mr. Brydon and Mr. Young would do honour to that selection, and that they would embellish Whitehall with architecture—free from the originality referred to by Colonel Prendergast, but with a touch of that individuality which distinguished already the works of those gentlemen, and which would hand down to posterity some of the most brilliant examples of architecture which this generation had produced.

INCORP. 1837 1887

9, Conduit Street, London, W., *12th November* 1898.

CHRONICLE.

The late Charles Garnier.

The Opening Meeting of the Session attracted a very satisfactory gathering of members and their friends, several ladies being among the visitors. The formal part of the business over, the President took the first opportunity of alluding to the decease of the gifted French architect, M. Charles Garnier, one of the most brilliant of the distinguished roll of Foreign Corresponding Members of the Institute. "M. Garnier," the President reminded his hearers, "many years ago was chosen by the Institute for the high distinction of the Gold Medal for Architecture conferred by her Majesty the Queen—and with great justice," continued the President; "for certainly he has given a new expression to French architecture. French architecture had peculiarities of its own, but M. Charles Garnier has added some new leaves to its laurels, and we have profound sorrow for the great misfortune of losing one who was the greatest living architect—not at a very early age, but still at a time of life when he might have done more work to delight the civilised world. When we think that Jacopo Sansovino, the architect of St. Mark's Library at Venice, lived to the age of 93, and had not at that advanced age taken to spectacles, we may consider that M. Charles Garnier was cut off many years before his time. But he was a man of nervous constitution, and his heavy labours told upon him, especially those of the Paris Opera House; his health could not endure the arduous work and expenditure of energy concomitant with the execution of such a great work." The President concluded by moving a vote of condolence with French architects and the Institute of France for the great loss they and architecture had sustained.

Allied Society Presidents elected Fellows.

Pursuant to the provisions of By-law 9, whereby the Council are empowered to elect to the Fellowship without ballot the President of any Allied Society who is eligible and applies for admission, the Council, at their meeting of Monday the 7th inst., elected the following gentlemen as Fellows of the Royal Institute, viz.:

Thomas Martin Cappon, President of the Dundee Institute of Architecture, Science, and Art; of 30 Reform Street, Dundee.

William Edward Willink, M.A. Cantab. [*A.*], President of the Liverpool Architectural Society; of Dingle Bank, Liverpool, and 14 Castle Street, Liverpool.

The Statutory Examination.

At the General Meeting of Monday the 7th inst., the Hon. Secretary announced that three gentlemen presented themselves at the Examination held by the Institute on the 27th and 28th ult., in accordance with the requirements of section 140 of the London Building Act (57 & 58 Vict. c. ccxiii.), with the result that one candidate passed, viz., Mr. George Henry Blagrove, of 7 Mornington Crescent, Regent's Park, N.W. The Council have accordingly granted this gentleman a Certificate of Competency to act as District Surveyor in London.

A Compliment from Canada.

The following letter, addressed to the Secretary R.I.B.A., has been received from Montreal:—

New York Life Building, Montreal:
October 28, 1898.

Sir,—The Province of Quebec Association of Architects, wishing to express to your distinguished Institute a mark of consideration, beg to offer the card of invitation and the programme of its Annual Meeting, regretting that the long distance separating us shall deprive our Association of the honour of counting you as one of its guests.

Yours respectfully,
Jas. Venne, *Secretary.*

Sir W. B. Richmond on English Art.

Sir W. B. Richmond, R.A. [*H.A.*], in the course of his address last Monday at the Birmingham and Midland Institute, expressed a hopeful opinion as to the future of art in England. A very healthy desire, he said, had grown up for the union of the arts, and with that a wholesome dislike of specialism. The arts were also widening their scope and play, and were therefore acquiring a firmer as well as a wider sympathy. The painting of pictures was slowly coming to be regarded, as no doubt it was, as a very important part of the arts, but not the only one. The marked strides that sculpture had made in recent years were very remarkable. He questioned whether England ever had cause to be so proud of her sculptors as at present. Among them they could name many men who were doing first-rate work. Most of these were in the prime of life, and there was evidence that there was a younger race springing up whose energy and talent would ere long come to the front.

Touching the future of architecture, Sir W. B. Richmond holds the view that the younger school of architects is composed of men who are original upon very safe lines. Their work is severe and restrained. With regard to the crafts, he confessed to having a very tender place in his heart towards them. The advance was so striking that one could not help drawing a conclusion therefrom—namely, that English people were really going to be tasteful as well as commercial. If that did happen, England would be even greater than she was now. It was a remarkable sign of the times when technical schools were being established over the country, and a still more interesting fact was that the work done was already upon a high level of excellence. He congratulated Birmingham and the Headmaster of the Birmingham School of Art that he and they moved with the times. The Birmingham School of Art was the best in England, because the instruction was not only very thorough, but very broad in its outlook. Especially did it interest and delight him to know that the lesser arts found great sympathy in their educational programme.

The decorative arts would be the arts of the future. Designing for metals, mosaics, and pottery was only valuable when the designer knew the capabilities of his material. South Kensington had been a great lesson. The system there had failed to succeed, as it might have succeeded if the original plan upon which the department was framed had been practical, not theoretical. While the South Kensington authorities had been asleep, some cities such as Birmingham, and even towns, had become alive to the necessity of training for the crafts by practice in them.

The lecturer looked forward to a time when England should take a place not even second to Italy at her best period. That would come when the unity of the arts had been established, when architecture, sculpture, and painting were all working together hand in hand with the crafts. It would come when the smallest jewel would be set so exquisitely and with such exuberance of fancy and finish that it would be prized, not for its intrinsic worth or marketable value, but because it was lovely. When the taste for the beautiful had been fully established in small things, and when people declined to buy ill-made and badly designed articles of finery, then the great epoch to which he had alluded would commence. It would be a time of a great liberal union, a great federation of all the states of art. They were going the way to attain it, but there was a great deal to be done yet. Art as a commercial business would have to cease. All labour should be well paid, but the labour which was always a pleasure was often too highly paid. The great movement to which he had alluded was due in a great measure to the labours of Burne-Jones and William Morris. What was going on at the present time which was truly vital, moving, and influential was in a large measure due to those great artists. There was, indeed, hope for the future, and even the belief that Englishmen would ere long determine to have all things beautiful as well as useful. Perhaps two centuries hence history might say, "Yes, what we know now is due to a few artists of the nineteenth century. There were some great painters, but there were two great designers who opened out their inventions for the public good, and gave their best, not only to picture galleries, but to our churches, to our homes, and to the people—William Morris and Edward Burne-Jones."

Architectural Copyright.

With reference to the Resolution passed at the Artistic Copyright Congress at Turin, quoted in the last number of the JOURNAL (Vol. V. p. 502), Monsieur Ch. Lucas [*Hon. Corr. M.*] writes as follows :—

> J'ai vu avec intérêt, dans ce numéro, la reproduction du vœu sur la *Propriété artistique des œuvres d'Architecture*, tel que ce vœu a été adopté par le Congrès international de la Propriété littéraire et artistique tenu à Turin en septembre dernier ; mais quelques lignes d'explication me semblent devoir, d'accord avec M. G. Harmand, avocat, qui a soutenu ce vœu au Congrès de Turin, être ajoutées sur l'origine même de ce vœu.
>
> En effet, ce vœu a été rédigé par M. Charles Lucas, architecte [*Hon. Corr. M.*] et par M. Georges Harmand, avocat, le premier, secrétaire, le second, membre du Conseil judiciaire, de la Caisse de Défense mutuelle des Architectes, et le vœu a été adressé, au nom de cette Association, par M. Alfred Normand, membre de l'Institut de France [*Hon. Corr. M.*], président de la Société Centrale et de la Caisse de Défense mutuelle des Architectes.
>
> Une légère modification de forme au vœu primitif a même été proposée en séance par M. Parodi, architecte italien, et adoptée, après observation de M. Poupinel, architecte à Paris, délégué par le Ministère de l'Instruction publique et par la Société Centrale.

Church Dedications.

Mr. J. D. Crace [*H.A.*] sends the following note in reference to *Studies in Church Dedications ; or, England's Patron Saints*, by Frances Arnold-Forster, which Messrs. Skeffington propose to issue if a sufficient number of subscribers' names are received :—

This work, of which the material is now ready for the printer, is one for which many an architect and many a glass painter must often have felt the need. The author (who is the granddaughter of the great Dr. Arnold of Rugby) has made its preparation a labour of love for years, and the name of Arnold is in itself a guarantee of careful and sound work.

As the book will extend to three 8vo. volumes, including notices of all the saints to whom churches have been dedicated throughout England, it is not surprising that the author is unable to face the whole liability of publication without some promise of subscribers; and Messrs. Skeffington, the publishers, of Piccadilly, have accordingly been authorised to issue a prospectus of the book, inviting subscriptions, to be paid when the book is ready for delivery. This prospectus is before me, and will no doubt be in the hands of the Librarian. I should suppose that many members of the Institute will welcome the publication, and be not unwilling to further it.

The late Henry Hewitt Bridgman [*F.*].

Mr. Henry Hewitt Bridgman, whose death took place on September 15 last, at 1 Camden Square, N.W., at the age of fifty-three, was elected Associate in 1871, and Fellow in 1883. He qualified as District Surveyor in 1878, but was never appointed.

A native of Torquay, he served his articles in the office of Mr. Edward Appleton, a Vice-President of the Institute. He came to London in 1867, and was sometime assistant to Mr. John Gibson. On the death of his brother Albert in 1875, Mr. Bridgman succeeded to the practice at 42 Poultry, London, where he soon found scope for his extreme energy in municipal life, being elected in 1884 one of the representatives of the Ward of Cheap in the Common Council. His business capacity procured rapid advancement to the Chairmanship of the Gas and Water and Streets Committees. He was next called to preside over the Law and City Courts Committee and at the opening of the new Court by Lord Halsbury, and was finally chosen Chairman of the Commission of Sewers, and Deputy of the Ward. Principally at his instance electric lighting was introduced, subway crossings at the Mansion House projected, Moorgate Street Station rebuilt, and Cheapside improvement decided upon. He received many testimonies of the esteem of his colleagues and fellow-citizens in presentations of plate, &c., and his portrait was subscribed for, and presented shortly before retirement through ill-health two years ago. He was a member of the Wheelwrights', Paviors', and Glovers' Companies. He obtained the 100*l.* prize for the Westgarth Essay on the realignment of main streets, was joint author of the scheme for a Central Fish Market over the foreshore between Waterloo and Charing Cross Bridges. Among executed works may be mentioned St. Pancras Vestry Hall and Workhouse Block, Steyning Union Infirmary, Bushey Board School, warehouses and offices in St. Bride Street, Cornhill, Queen Street, Chancery Lane, &c. A Liberal in politics, he contested Taunton in 1892, unsuccessfully.

The funeral took place at Highgate Cemetery on September 19, many of his old colleagues on the Council and friends being present, recognising that the administrative body of the City of London, during a very critical period of its existence, had in Mr. Bridgman a most able and energetic Councillor.—Edwd. Wm. Hudson.

REVIEWS.

VENTILATION AND HEATING.

Report on the Ventilation and Warming in certain of the Metropolitan Poor Law Schools. By William Napier Shaw, of Emmanuel College, Cambridge, M.A., F.R.S., Lecturer on Experimental Physics in the University of Cambridge.

This Report to the Local Government Board, published as a "Blue Book" and presented to Parliament on the 5th August 1898, contains much information on the subjects of ventilation and heating useful to architects. The introductory remarks concisely define what is generally considered requisite to secure ventilation; some points of importance are, however, conspicuous by their absence.

1. The necessity for a more thorough change of air in apartments when *not* occupied.
2. The result of contamination of surfaces of and in an apartment long occupied and inefficiently ventilated.
3. The effect of various qualities of building materials on ventilation and warming.
4. The apparent want of appreciation of the fact that the natural force which can principally be relied on for securing change of air within a building is *gravitation.*
5. The relative merits of upward and downward ventilation.
6. The relative merits of *propelling* and *suctional* forces, particularly when mechanical means are employed to secure ventilation.

With regard to (1), it may have been thought to be so well recognised as to require no comment, but as there is frequent reference to the want of knowledge and attention, on the part of the school officials, to the requirements of and the provisions made for ventilation, it would have been well to emphasise the necessity for opening windows and doors to the utmost whenever rooms are unoccupied.

As to (2), mere change of air is not always sufficient to ensure purity of the atmosphere in an apartment much occupied. All surfaces should be periodically cleansed, or stuffiness will result.

(3) Hard, impervious materials do not readily absorb heat; they are naturally cold, and consequently prone to encourage condensation, which,

in occupied rooms, consists, in addition to moisture, of organic matter liable to putrefaction.

(4) With the exception of a suctional force, produced by wind passing rapidly across an opening, ventilation by natural means is produced by *propulsion*, either brought about directly by the force of wind, or, when heat is employed, by rarefied air or gases being forced upward by the gravitation of colder, and consequently heavier, air, and not by the lighter air ascending and sucking the colder air inwards. To many this may appear a subtle distinction, but the absolute realisation thereof will greatly assist in the appreciation of many details necessary to be understood by those who desire to secure efficient ventilation. It should also prove to those who have hitherto opposed ventilation by propulsion that such is in reality nature's principal method.

(5) Cross-ventilation by windows opened at the top is frequently referred to in the Report, and the cooling tendency thereof and draughtiness noted. Yet there is little remark upon the effect of such a crude method of procuring fresh air for the occupants of an apartment. It would have been well to have pointed out that under such conditions the volume of air estimated to be required per head would principally sweep across the ceiling, in at one window, out at another, while air in the lower and occupied portion of the room would remain comparatively stagnant.

In an ordinary room, with a fireplace and flues, change of air throughout is best secured by an inlet or inlets on the same side as the fireplace, at about two-thirds the height of the room, formed so as to direct the incoming air slightly upwards; it will then spread itself out, become diffused and tempered, will gradually descend and be forced out up the fireplace flue. This is downward ventilation, and by its means every occupant of the room may, with the least possible discomfort, receive a suitable supply of fresh air at a minimum loss of temperature in cold weather. One would therefore have expected to find advocated in the Report an arrangement of suitable inlets in the upper portions of rooms and of outlets near the floor levels.

(6) Although it is refreshing to find *ventilation by mechanical means* advocated officially, it is evident that the necessary precautions essential to success therewith have not been fully grasped. It is true that in Recommendation 3 (page 43) mention is made of "apparatus for *supplying* warmed air mechanically," but there is nothing elsewhere to serve as a guide whether propulsion or extraction is advocated, nor is there any reference to the necessity for cleansing the air supply or regulating its hygrostatic condition. One might reasonably have expected the explanation that, by employing propulsion, the source of supply can be selected, the air can be cleansed, tempered, and brought to a proper state of humidity, and forced in directions most suited to those for whom it is wanted; and that, should extraction be employed, there is no telling whence the air may be drawn; it cannot be either cleansed, tempered, or humidified, and the power expended may simply be wasted in drawing air from inlet to outlet without supplying adequate change where wanted.

The most unfortunate recommendation is contained at the end of paragraph 3, above referred to, viz., that "the existing openings for ventilation be retained as outlets for the air." To follow such a course would assuredly end in failure and in condemnation of ventilation by mechanical means, for with such it is imperatively necessary that the position of outlets shall be as carefully selected and apportioned as the inlets, and so constructed that movement of the outer atmosphere, which is constantly varying, may exercise no influence upon the outflow; because, unless these precautions are taken, the supply and temperature will fluctuate, and unpleasant draughts may result.

The last paragraph but one in the introductory remarks (page 6) seems to imply that complete control of ventilation can only be secured by motive power applied both at the inlets and at the outlets. This in practice has proved to be a fallacy. A little consideration ought to convince any one that with such there must be either actual loss of power or air drawn from unknown sources.

Although I have thought it advisable to direct attention to what I consider the shortcomings of the Report, I feel indebted to Mr. Shaw for the very thorough examination of the buildings he visited, for the matters to which he has drawn attention, and for the many valuable recommendations he has made.

He has done well to emphasise the utter want of knowledge, on the part of some officials, of the means provided for ventilation, and the lack of attention to their suitable maintenance and cleanliness; also to the erroneous but widespread belief that, when suitable means are provided, they are intended to work automatically, and require no personal attention, whatever change there may be in the condition of the outer atmosphere. The suggestion in a footnote (page 31) that there should be "ventilation drill," should certainly be adopted and acted upon, not only in the Metropolitan Poor Law Schools, but in every school and public institution throughout the kingdom. It would be the best means of directing the attention of officials, teachers, and children to the importance of efficient ventilation in regard to health; it would develop observation; and haply the next generation may take as much interest in the subject and be as prepared to incur adequate expenditure to secure efficient ventilation as is now considered necessary to obtain a pure and abundant water supply.

The Report is well illustrated by plans and views of buildings visited and by temperature charts. William Henman.

Birmingham.

LIGHT AND AIR.

The Law of Light and Air. By A. A. Hudson and Arnold Inman, Barristers-at-Law. Small 8o. Lond. 1898. [Frank P. Wilson, St. Bride Street, E.C.]

This is a good book. The law relating to light and air is stated succinctly, and, on the whole, fully, clearly, and accurately. At the same time it seems doubtful whether it will supply any real want. It seems too large for the architect, and too small for the lawyer. That very useful book for the architect who merely wants to see when questions as to light and air are likely to arise, and who is too wise to try to decide them for himself when they do arise—Roscoe's *Digest of the Law of Light*—is likely to remain the book used by most architects. While as long as such works as *Gale* and *Goddard on Easements* are to hand, lawyers are not likely to consult this little book.

The system adopted by the authors in their exposition of the law is much the same as that followed by Mr. Hudson in his large treatise on Building Contracts. They first state the principle of law somewhat in the form of a rule, and then illustrate it by decided cases as examples. Some of the comments on the principles involved are not very profound. For example, at p. 7 it is said: "It is inaccurate to say that a man has a right to receive light or air through a certain window or aperture; it is manifest that at night, or in a London fog, he has nothing of the kind; what he has, or may have, is a right to prevent his neighbour or any other person from obstructing such light or air as would naturally reach and pass through the window or aperture in question." It did not need two lawyers come from the Temple to tell us that.

By far the weakest part of the book is that which deals with the remedies for interference with right of lights and air. There is no sufficient statement as to the difference between an ordinary injunction to restrain a threatened obstruction of light and a mandatory injunction directing the removal of an obstruction existing at the time the action was brought. The former is granted as a matter of course, on proof that the right to light will be infringed. The latter is rarely granted, save where there has been some fraud or concealment on the part of the person responsible for the erection of the obstruction (*Martin* v. *Price* (1894), 1 Ch. 276). This should be of much importance where the obstructing building was erected in the twentieth year of the enjoyment of the right to light. Till the full period of prescription (twenty years) is past, the right to the enjoyment is not complete (*Lord Battersea* v. *Commissioners of Sewers for the City of London* (1895) 2 Ch. 708). At the same time it is impossible to interrupt the enjoyment for a year (the interruption required by the Prescription Act) before the full period is completed. Obstructing buildings then erected in the twentieth year are lawfully erected, but they do not prevent the legal right to the light accruing at the end of the twentieth year. They being lawfully erected, however, it is almost certain the Court would not grant a mandatory injunction at the end of the twentieth year directing the owner to pull them down. It probably would give damages instead.

There is one rather serious objection to be made to this book if all the copies issued are like that one now before me. Though well printed and neatly bound, the stitching is done so badly that already a considerable number of pages are loose.

J. Andrew Strahan,
Barrister-at-Law [H.A.].

THE CEYLON SURVEYS.

Archæological Survey of Ceylon. Reports x, xii, xiii, xix. By H. C. P. Bell, C.C.S., Archæological Commissioner, Colombo, 1893-1896.

Report xix. has been already noticed in these pages,* and also some of Mr. Bell's earlier *Reports.*† These *Reports* are amply illustrated with maps, plans, sections, and reproductions from photographs; the reproductions, although of a very rude and primitive kind, yet convey a distinct enough idea of the architectural forms. Mr. Bell still continues his explorations at Anurádhapura. As this place may not be very familiar to most readers, it will perhaps be as well to repeat that it was the ancient capital of Ceylon, and that it enjoyed that dignity for about a thousand years—that is, from about 500 B.C. till about 500 A.D. During that period the "Island of Gems" was in a flourishing state, and the resources being plentiful, large numbers of architectural structures were produced. These included palaces, monasteries, and dágabas, the last mentioned monuments, perhaps, with the exception of Boro Boddor in Java, and one at Mengún in Burmah, being the largest of the kind in the East. The remains of the old city, which covered many miles of ground, now lie under an accumulation of soil and forest growth, the increase of centuries, during which the place has been deserted. All this has to be removed before anything becomes visible to the explorer, and still more has to be dug out in order to realise what has been found. Sometimes, during the monsoon, the ground is a swamp; and when there is no rain, the soil becomes hard as iron, when digging is all but impossible. In the midst of these difficulties Mr. Bell has been "pegging away," and doing good work, but although he has cleared out a good many sites, it cannot be said that he has come upon much that is new. The type of each kind of structure had become so firmly fixed, that any fresh find seems to be only a repetition of the one that had been explored before.

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* Journal, 16th February 1893.

† Journal, 27th August 1891; 29th September 1892; and 15th February 1894.

This will explain how it chances there is very little that is new to record. Ancient roads have been traced, and these help so far in working out the original plan of Anurádhapura; more copper plaques with inscriptions have also been come upon, and these Mr. Bell considers will be not only valuable for the palæography of Ceylon, but in addition they will give a sure period from which the dates backwards and forwards of architectural remains can now be more safely worked out.

In his *Indian and Eastern Architecture*, p. 219, Fergusson gives the plan of a temple at Aiwulli, and at p. 221, the plan of a temple at Pittadkul; these were first discovered and drawn by Dr. Burgess. Fergusson naturally attached considerable importance to them from their resemblance to the Chaitya halls of the Buddhists, from which he thought they were derived. If the plan of Viháré, No. 2, at Pankuliya, in Mr. Bell's Report, xiii., pl. xvi., is looked at, and also Viháré, No. 2, at the Vijayaráma monastery, in Report x., pl. xii., the resemblance in them to the plans of Dr. Burgess appears to be very close; the Pankuliya example and the Pittadkul temple might be described as almost identical. The walls in both cases are rectangular, and both have the same *pradakshina* or circumambulating path. The Ceylon structure is what the local phraseology calls a *pilimá-ge*, or "image-house"; it contained a seated figure of Buddha, and does not appear to have been developed from a Chaitya hall. Still, the type may have been derived from the South of India, for Aiwulli is supposed to date from the seventh century A.D., and the buildings at Pankuliya are as late as perhaps the ninth or tenth century. Still, if the Buddhists had "image-houses" in Ceylon, it is highly probable that they had similar houses or temples of that character in India, and that possibility raises a slight shade of doubt about Fergusson's theory of origin for the Aiwulli and Pittadkul temples. I do not consider that he was far wrong, but we had better wait for further discoveries in order to be certain of the exact conditions of the development.

Writers on Indian archæology apply the word "Vihára" exclusively to the places where the Buddhist monks dwelt, to distinguish such structures from Chaitya halls or Stûpas; but in Ceylon the same word—although slightly different in spelling—Viháré, is applied to a *pilimá-ge* or image-house, which is a temple and not a residence. Wishing to know exactly what this word means, I wrote to Professor Rhys Davids, whose high proficiency as a Sanskrit authority is so well known, and I here give the answer he has kindly favoured me with, as it may be of value to others. "In the old texts—the Pitaka texts—vihára always means a *cell*. It comes from viharati, 'to dwell, to remain,' and means a cell, or hut, because the Bhikshu dwelt, remained there. In Ceylon, however, and I believe also in Burmah, the word was extended to the whole of a religious site, so that dagába, image-house, and cells, all together, form a vihára. It is not known *when* this use of the word began; probably very late, tenth or twelfth century A.D."

From this it will be evident that this Sanskrit word when used in Singhalese archæology must be understood in a different sense from what it is in India. Already we have a case of the same kind —what is known in India as a "Stûpa" is always called a dagába in Ceylon. *Pariséna*, according to Mr. Bell's glossary, is the Ceylon word for a monk's residence; or *Pansala*, from *pan*, a "leaf," and *sala*, a "hall," or "house;" this last word is well enough known in India, for it was used to express the leafy bower to which a Brahman retired when he reached a certain age, so that he might, in his last years, prepare himself in this world for absorption into the next.

Mr. Bell has some remarks * on the succession of animals which occur on the moonstones—moonstones, it may be explained, are large semicircular slabs at the foot of steps leading to dagábas or image-houses; the animals are the elephant, lion, horse, and bull; sometimes the *hansa* or goose figures among them. This succession of animals appears also occasionally in Brahmanical architecture. In reviewing Mr. Smither's work on Anurádhapura † I pointed out that they were found in tiers or large mouldings round the base of the temple at Hullabîd; also, that they were known in Buddhist architecture, from Fa Hian's description of the great rock-cut monastery in the Dekhan. Mr. Bell is no doubt right in his identification of these animals with those of the sacred Anotatta-vila lake. Lake Manasarovar, which is equally sacred with the Brahmans, and is probably the same as Anotatta-vila, has the four animals, and they are the sources, or mouths, from which flow four rivers—the Indus, Sutlej, Brahmaputra, and the Ghogra. It may also be accepted, as Mr. Bell suggests, that these four animals represented the four quarters, or the cardinal points. The Brahmanic mythology has four gods of the quarters; in Egypt, the Four Genii of Amenta originated from the four quarters; and the four cherubic forms were, in the Christian church, given to the four evangelists; the reason for the four gospels being, according to Irenæus, that there were "four zones" in the world, and "four principal winds," which means the cardinal points. These four creatures, which bear some resemblance in the instances just given, may have had their first origin in the four quarters of the Zodiac, which is perhaps the most probable guess, but we may have to wait for further knowledge from cuneiform, or even the earlier Akkadian inscriptions, before anything like certainty can be assumed on the subject.

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* Report xii. p. 16.

† JOURNAL, 1895, Vol. II. p. 456.

Report xiii., in addition to some details about Anurádhapura, contains an account of "circuit work," or a tour in the North-Central Province, which gives us glimpses of the old *bunds* or dams for storing water; their number and great size explains the ample fertility which Ceylon at one time enjoyed when it was a prosperous country. As we may say it was the Nile, from the fertility it produced, that built the pyramids and the vast temples of Egypt, so it was these large artificial lakes that supported a great city like Anarádhapura, and constructed the extensive monasteries and huge dagábas whose very magnitude almost defy Mr. Bell and his limited means to explore them. Amongst these reservoirs the Padaviya-vewa had amongst its titles that of *Máha Ságara*, or "The Great Sea," and its size may be roughly guessed when it is stated that the embankment which retained its waters was about three miles in length. This embankment, and others almost as large, have long ago had breaches in them, and the ground has been left in the condition of an unhealthy swamp, the abode of fevers and wild beasts.

William Simpson.

MINUTES. I.

At the First General Meeting (Ordinary) of the Session 1898–99, held Monday, 7th November 1898, at 8 p.m., Professor Aitchison, R.A., *President*, in the Chair, with 44 Fellows (including 19 members of the Council), 26 Associates (including one member of the Council), 3 Hon. Associates, and numerous visitors, the Minutes of the Meeting held Monday 27th June 1898 [Vol. V. p. 449] were taken as read, and signed as correct.

The Hon. Secretary announced the decease of the following members:—Major Alfred Heales [*H.A.*], Henry Hewitt Bridgman [*F.*], and John Gillett Livesay [*A.*].

The following member, attending for the first time since his election to the class of Fellows, was formally admitted and signed the Register, viz.—William Banks Gwyther (Calcutta).

The Hon. Secretary announced that, by a Resolution of the Council under By-law 20, Messrs. John Horbury Hunt and Frederick Moorhouse, both of Sydney, New South Wales, and Mr. Ernest Alfred Mayo, of Chicago, had ceased to be members of the Royal Institute.

The Hon. Secretary further announced that Mr. William Nicholson Cumming (Edinburgh) had been reinstated an Associate of the Royal Institute.

The Hon. Secretary announced the results of the Statutory Examination for the office of District Surveyor under the London Building Act held on the 27th and 28th October, and that the Council had granted a Certificate of Competency to the successful candidate [see p. 10].

The following candidates for membership, found by the Council to be eligible and qualified according to the Charter and By-laws, and admitted by them to candidature, were recommended for election, namely:—As FELLOWS, Robert Lockhart McCowat, Johannesburg; William White Cooper, M.A. Cantab., M.A. University of the Cape of Good Hope, Diocesan Architect to the Diocese of Grahamstown; Henry Thomas Hare [*A.*], *Ashpitel Prizeman* 1886; William Henry Duffield [*A.*]. As ASSOCIATES, John Cecil Baines (*Probationer* 1894, *Student* 1896, *Qualified* 1898); Christopher William Surrey (*Probationer* 1891, *Student* 1894, *Qualified* 1898); Albert Herbert (*Probationer* 1893, *Student* 1894, *Qualified* 1898, *Cates Prizeman June* 1898) (Leicester); Louis Moore (*Probationer* 1893, *Student* 1895, *Qualified* 1898) (Southampton); Percival Cherry Blow (*Probationer* 1890, *Student* 1894, *Qualified* 1898) (St. Albans); James Stockdale Harrison (*Probationer* 1892, *Student* 1895, *Qualified* 1898) (Leicester); Ethel Mary Charles (*Probationer* 1893, *Student* 1895, *Qualified* 1898); Arthur Reutlinger Gough (*Probationer* 1891, *Student* 1895, *Qualified* 1898) (Bristol); Charles Riddey (*Probationer* 1894, *Student* 1896, *Qualified* 1898) (Wellingborough); Victor Evans Bösher (*Probationer* 1892, *Student* 1895, *Qualified* 1898) (St. Leonards-on-Sea); Robert Walter Carden (*Probationer* 1893, *Student* 1896, *Qualified* 1898); Arthur William Vercoe (*Probationer* 1891, *Student* 1892, *Qualified* 1898); Alexander Cowie (*Probationer* 1894, *Student* 1896, *Qualified* 1898); Gerald McMichael (*Probationer* 1892, *Student* 1895, *Qualified* 1898) (Birmingham). As HON. ASSOCIATE, Sir Alexander Binnie.

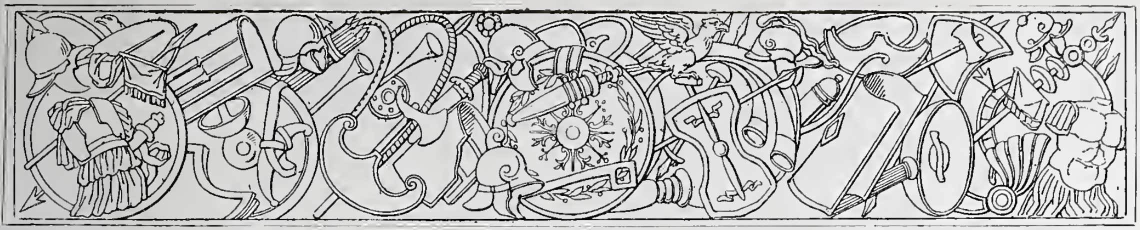
Mr. W. Hilton Nash [*F.*] having raised a question respecting the nomination of Miss Charles, Mr. E. A. Gruning, *Vice-President*, replying for the Council, pointed out that the candidate had been admitted by the Council to the various Examinations, and had duly qualified for candidature under the By-law, and that the Council were unanimously of opinion that they had no right to refuse the nomination.

The President, having tendered his thanks to members for the honour they had done him in electing him for a third year to the Presidential Chair, made sympathetic allusion to the death of M. Charles Garnier [*Hon. Corr. M.* and *Royal Gold Medallist*], and on his motion it was

> Resolved, that an expression of sympathy and condolence with the architects of France and the Institute of France, in the loss they had sustained by the death of their distinguished colleague, M. Charles Garnier, be entered on the Minutes of the Meeting and communicated to the Institute of France.

The Opening Address of the Session having been delivered by the President, a vote of thanks, moved by Colonel Lenox Prendergast [*H.A.*] and seconded by Professor T. Roger Smith [*F.*], was passed to him by acclamation.

Mr. William Woodward [*A.*] having referred in appreciative terms to the Government's selection of the architects for the new Public Offices, the proceedings closed, and the Meeting separated at 9.30 p.m.



ON THE COMPARATIVE VALUE OF DOCUMENTARY AND ARCHITECTURAL EVIDENCE IN ESTABLISHING THE CHRONOLOGY OF THE ENGLISH CATHEDRALS. By Francis Bond [*H.A.*], M.A.Oxon., F.G.S.

Read before the Royal Institute of British Architects, Monday, 21st November 1898.

SOME time back I was led to examine the accepted chronology of the south side of the nave of Waltham Abbey Church.* On examination it appeared that the eastern bays differed slightly in date from the western bays; but that the whole of the work was of the usual character of that done in the first half of the twelfth century, and in particular was closely akin to the work at Durham, Lindisfarne, and Dunfermline, and had nothing in common with the eleventh-century work either of England or of Normandy. That none of Waltham nave was built before 1120 was an irresistible conclusion. But if the voluminous literature on the subject † be examined it will be found that men of high attainments and technical experience agreed to a far earlier date: viz. that much of the nave, as we now have it, is the identical work consecrated in the year 1060 or 1062, in the time of Edward the Confessor. This contention was backed by the great name of Professor Freeman, whose knowledge of the Romanesque architecture of the Continent and England was very extensive; by Bishop Stubbs, the historian of mediæval England; by Mr. Thomas Wright, the well-known antiquary; by the late Mr. Burges, who was in charge of the restoration of the church; and by Mr. Reeve, who assisted in the restoration, and published measured drawings in 1876, showing the portions purporting to be of the days of Harold. Yet, as I have said, the conclusion that no portion of the work is less than sixty years subsequent to the reign of Harold is patent and obvious. Waltham Abbey, however, is far from being the only example of what may, I hope, without undue presumption, be termed archæological aberrations. A striking example is that of the cathedral of Wells. One school of archæologists dated the nave after the west front, though the nave is far the more archaic in character of the two. On the other hand, Professor Willis, *clarum et venerabile nomen*, dated the west front after the nave; unfortunately he puts both a whole generation too late. Now, on seeing these extraordinary perturbations of chronology, emanating from men of very high authority as antiquarians —only two instances have been adduced, but you will be able to make a long list for yourselves—one could not help asking, one felt bound to ask, what was at the bottom of it all? Was there some radical error in principle, some flaw in the methods of research employed, which led to errors of such portentous magnitude? An error of fifty or sixty years, as in the examples of Waltham and Wells, is really portentous. What was the cause of it? That is the subject to which I propose briefly to address myself this evening.

This cause, as the title of this paper may have led you to surmise, appears to lie in the wrong estimate usually formed by antiquarians of the comparative value of documentary and architectural evidence. By documentary, or, as it is often called, historical evidence, I mean the references, direct or indirect, to the history of the cathedral, in annalists, monastic chroniclers, fabric rolls, registers, wills, and the like. By architectural evidence I mean the evidence of the stones and mortar.

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* See *Builder*, April 30, May 7, 21, June 4, 11, 1898.

† See *Gentleman's Magazine* for 1859 and 1860; *Architect*, January and February 1876; *Builder*, vol. xviii. p. 71.

The question is, Which is the more reliable? The answer shall be given in Professor Willis's own words, which fairly represent the accepted opinion of archæologists. They are taken from the Proceedings of the Archæological Institute at Peterborough in 1861. He says, "In all investigations of this nature I am of opinion that it is requisite to ascertain *first* whether there exist any contemporary documents which may throw light upon the history of the fabric, and *then* to let the stones tell their own tale." First you are to study the documentary or external, then to study the architectural or internal evidence. Not till your mind is prejudiced and warped by what the documents assert are you allowed to study stones and mortar. The stones and mortar are called in to corroborate the historical evidence; but you must never call them in to correct it. And if one contradicts the other, the one to go to the wall must always be the architectural and never the documentary evidence. This—to put it crudely—is the criterion as to the use of evidence in establishing the chronology of the English cathedrals. The rightness of this criterion is what I propose to discuss.

What does this documentary evidence consist of? Partly of statements, usually brief and obscure, in annalists and chroniclers; partly of the accounts, which may have been preserved in fabric rolls and the like, of the expenditure from year to year on the building; partly of the dates of consecrations and the like. Taking these in order, it is to be remarked in the first place that Professor Willis's criterion strictly confines itself to contemporary documents. Few of the statements, however, as to building operations in the cathedrals are made by contemporaries; frequently they are the words of people who lived several generations or even whole centuries later, and who knew as little about the matter in hand as ourselves—*e.g.* the ascription of the building of the choir, transepts, and nave of Wells, as well as the west front, to Bishop Jocelin, which was accepted as an article of faith by Professor Willis, Professor Freeman, Mr. J. E. Parker, and almost everybody else till lately, was based on a statement of Bishop Godwin, which was itself based on an anonymous manuscript, "The Canon of Wells." But Bishop Godwin lived in the sixteenth century, and the manuscript was written in the fifteenth century; so that, far from being contemporary documents, one was three and the other four centuries subsequent to the matters described. The stones and mortar of Wells told their tale with perfect clearness to Professor Willis, to Britton and others: but they refused to believe it because it conflicted with documentary evidence, and that at least 300 years more modern than the matters described in it. So that it is not going too far to assert that it has been a rule in English archæology that where documentary and architectural evidence conflict, the latter shall go to the wall. So much for evidence which does not come from contemporaries.

But if the evidence does come from contemporaries, can it be trusted? Well, we are dealing with historians who lived in the twelfth century and onward. Did they in those illiterate days possess what is called nowadays the "historical conscience"? I am afraid not. So far from that, I believe that they sometimes deliberately misrepresented and falsified their history. They admit themselves that they did; so that an action for libel does not lie against the writer when he charges them with being at times deliberately mendacious. Here is what one of the chief of them, Matthew Paris, says. He is describing a new oak roof at St. Albans, constructed at the instigation and by the labour of Michael of Thydenhanger, monk and camerarius. "Nevertheless," he adds, "these works must be ascribed to the abbot, out of respect to his office." There was not much of the "historical conscience" in

Matthew Paris. The fact is, the monastic and mediæval chroniclers had likes and dislikes. Nothing was too bad to say of an unpopular abbot or bishop, nothing too good to say of a favourite. What is worst of all for the archæologist, any good work, any fine building erected by the unpopular may have been attributed to the popular abbot or bishop. Take an example from Hereford. The north transept of Hereford Cathedral—one of the most original and lovely designs in English mediæval architecture—has been attributed again and again to Bishop Swinfield (1283–1316).* Yet it is quite different in character from Swinfield's work: the Cantilupe shrine, the inner north porch, the north-east transept, and the aisles of nave and choir. Its detached and banded Purbeck-marble shafts, the bands of tooth ornament in the arches, the cusped circles of the tracery of the triforium and of the windows, the curious circular windows of triforium and clerestory (reminiscent of Westminster and Lichfield)—all point to an earlier date, and make it synchronous with the beautiful angel choir of Lincoln. But there is one piece of evidence that seems to me irresistible. The design most certainly came from the same brain as that of the exquisite tomb of Bishop Aquablanca (1240–1268). The man who built the transept built the tomb. Now no one will assert that Bishop Swinfield would build a tomb—especially such an elaborate and expensive tomb—for Aquablanca. *Ergo* neither did he build the transept. Aquablanca built his tomb in his own lifetime, as most prelates did; and he built the transept as well. Why then has the credit of it been taken from him so often and transferred to Swinfield? Simply because Swinfield was popular at Hereford, and Aquablanca was not. Swinfield made the fortune of Hereford Cathedral by procuring for it a new saint in Thomas Cantilupe. Aquablanca was one of the intruding foreigners so bitterly loathed in England in the thirteenth century—an Italian from Savoy. The canons had elected a nominee of their own; Henry III. had annulled the election in favour of Aquablanca. The new bishop was driven out of his own see by the barons in 1263, and was rebuked next year by Henry III. for not being in it. He was again attacked by the barons in his own cathedral, imprisoned, his goods confiscated and divided. He had advised the king to tax the clergy; and no treatment was bad enough for him, and no abuse too strong. His end was miserable; he died a leper. What wonder then that the credit even of his good works was denied him! Yet he was not altogether the scoundrel he has been represented to be. When successful in litigation with the city, he remitted half the fine, and handed over the other half to the fabric of the cathedral; he gave the manor of Holme Lacy to the cathedral; he remembered the poor in their affliction, and from his bequest 2,000 loaves are still distributed every year to the poor of Hereford.

On similar grounds we may dispute some of the bewildering chronology of the monastic chroniclers of Peterborough, Swapham and Abbot John. Both assert that Abbot Benedict built "the whole nave from the central tower to the west front." Abbot Benedict ruled from 1177 to 1194. Swapham was still living *c.* 1240; so that he was probably alive, though but young, in Benedict's time. Yet what he says is false.† The whole of the eastern bays of the nave, with the exception of the clerestory, is strictly Romanesque: the only part which can possibly have been built by Benedict is the western transept, the adjoining bays of the nave, and perhaps the clerestory. Now, what may have induced the chroniclers to magnify the work of Benedict? Simply that he had wrought much good to the abbey. He was a monk of Canterbury and a personal friend of Becket; the monks no doubt thought themselves lucky to get an abbot fresh from the scene of the murder. Moreover, the monks of Peterborough were short of relics; Benedict "conveyed" from Canterbury inestimable treasures—

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* The author of the handbook on Hereford in Bell's Cathedral Series, with great impartiality, gives the date on page 43 as 1287, and on page 9 as anterior to 1268.

† The handwriting of Swapham's book is said to be that of the latter part of the fourteenth century.

two crystal vases filled with Becket's blood; the martyr's shirt and surplice; and the blood-stained stones of Canterbury north transept, where the murdered archbishop fell. A little falsification of architectural history was surely permissible in favour of so great a benefactor to our abbey!

So far from being all built in the time of a single abbot, there is clear internal evidence of four distinct building-periods in the nave of Peterborough. (1) At the same time with the crossing, and to support the piers and arches of the crossing, part of the eastern bays of the nave was built. This included one bay of the clerestory, which differs externally from the western bays in having two contracted arches instead of a single wide one; two bays of the triforium, which have the hatched tympanum of the choir and transepts; and the five eastern bays of the pier arcade—or most of them—which, with the whole of the bays on the south side, except the westernmost, have bases of Norman profile, and not the Attic base which appears in the western bays of the north side. To this period also probably belongs at least the lower portion of most of the south aisle wall, which would be needed early to shut in the cloister on the north. The shafts and string of the inner arcade of this wall are much ruder than those in the north aisle. The wall of the south aisle at first extended only as far as the Abbot's doorway; for at that point the intersecting arches of the arcade are reversed, from left to right. (2) The remaining southern bays of the pier arcade and triforium of the nave, except the westernmost bay, come next. They were long in the open air; the putlog holes were found at the restoration to be crammed with ancient bird-nests. (3) Next came the remaining bays of the north side, which have the Attic base, the westernmost bay excepted; when these were completed as far as the top of the triforium, the nave was covered with a temporary roof. (4) Fourthly, perhaps in the time of Abbot Benedict, was built the clerestory of the whole nave, which has pointed hood-moulds, and the new Transitional west front (merged later in the present Gothic west front); then the Transitional west front was joined up to the Norman nave.

All the chroniclers, however, were not mendacious; they would not lie except in a good cause. Nevertheless they were not writing for architects, nor were they architects themselves; consequently there is no precision or definiteness about their language; and it is extremely dangerous to build large theories on their curt and nebulous statements. Very often the chronicler, without being deliberately mendacious, is unintentionally misleading. I am not sure there is not an example of this in Simeon's Continuator at Durham. He says, writing not much later, that the nave was finished by Bishop Ralph Flambard, who died in 1128, "ad sui usque testudinem." If "testudo" means "vault," it may refer to the vault of the aisles, or to the high vault of the nave. If the latter, then, arguing from another passage in the same writer, which is to the effect that "the nave was finished by the monks between 1128 and 1133," Canon Greenwell is right in asserting that Durham high nave was vaulted *c.* 1130, and the choir probably *c.* 1100, which would prove that in vaulting the English builders were a whole generation ahead of their Romanesque brethren anywhere on the Continent. But "testudo" may refer quite well to the vault of the aisles, in which case what Flambard did was to construct and vault the aisles, and to build the pier-arcade and triforium of the nave; and what the monks did was to complete the nave by building the clerestory and roofing it in wood.

Again, the chronicler's statement may be perfectly true; but we may apply it to the wrong building: in which case it is we ourselves who falsify history, and not the chronicler. In 1284 Archbishop Wickwane and in 1287 Archbishop Romayne issued letters of indulgence for forty days to those who should contribute to the works of Ripon Minster. This Mr. Walbran interpreted to refer to the west front of the church, whereas it refers to the east front, which from its similarity to the work at Guisborough and elsewhere was plainly rebuilt *c.* 1290. Thus he dates the work both in the west and in the east fronts wrongly.

Then, again, there are many gaps, and huge gaps, in the monastic chronicles, just as there are in the geological record. Some of the biggest works are not mentioned at all. Swapham, who saw that marvellous façade at Peterborough rise before his eyes, has not a single word about it, though he takes upon himself to describe work that was done when he was in short frocks. We must not argue, because there is no historical record of work done by a particular bishop or abbot, that therefore he did nothing. It would be just as perilous to argue in geology that no strata were deposited, no new creatures evolved, between the Carboniferous and New Red Sandstone periods. Yet large theories have been built on this dangerous negative evidence. The peril is that new evidence may turn up any day; the gap may be filled up; the prelate who has been credited with no work may turn out to have been building busily all the time. This was the case at Wells. Stones and mortar plainly say that the choir, transepts, and nave were built successively in the last quarter of the twelfth century. The bishop of that period was Reginald Fitz-Jocelin (1174–1191). Nothing was known of him as a builder; much was known of Bishop Jocelin (1206–1242); therefore, to the utter upsetting of all canons of architectural criticism, choir, transepts, and nave were all put to the credit of Bishop Jocelin, as well as the west front, which is undoubtedly his. But the west front is far more advanced in style than the nave and the rest. Therefore the archæologists evolved out of their inner consciousness a wholly imaginary school of Somersetshire masons. Two sets of masons were working together at Wells, they said, in Bishop Jocelin's time; clever masons, imported from Lincoln and elsewhere, with the latest thing in Gothic; these were employed on the west front; the others were local masons, who in their stupid, backward, Somersetshire fashion worked away at the nave after a style which had gone out of use elsewhere for a whole generation. Unfortunately for this theory, Mr. Bennett has lately deciphered a charter prior to 1180 in which Bishop Reginald "arranges in full chapter for a munificent grant in support of the fabric, until the work be finished." And another charter of the same bishop's time speaks of "the admirable structure of the rising church." So vanishes into space Bishop Jocelin's share in choir, transepts, and nave; and that delightful school of stupid Somersetshire masons invented to prop it up. One reason, perhaps, why the archæologists were shy of giving the credit of the Wells work to Bishop Reginald was that he was a good sportsman, fond of hawking and hunting: he procured from Richard I. a confirmation of the alleged privilege of the Bishops of Wells to keep "canes ad fugandum per totam Somerset." He had good sport, no doubt, in the forests which then covered the Mendips. But because he was a great sportsman we must not conclude that he was not a great builder. It were as irrational for a twenty-sixth century historian to deny that Lord Rosebery was once Prime Minister because he twice won the Derby.

The danger of building theories on negative evidence may be illustrated again from Worcester. Bishop William of Blois is recorded to have laid the foundations of the "novum opus frontis" in 1224. Nothing is recorded of any building during the earlier years of the thirteenth century. Hence it is asserted that the whole of the eastern part of Worcester Cathedral was built after the year 1224. The evidence of stones and mortar, however, points to two building periods, both confined to the first half of the thirteenth century. The foliated capitals of the western bays are in high projection, plainly subsequent to 1224; those of the eastern bays are small and knobby, and, with the double arcade in the triforium, the ornamentation of the tympana in the triforium arches, and the sculpture of the spandrils of the wall arcades, are obviously inspired by St. Hugh's work at Lincoln, *c.* 1200. Differences also exist in the mouldings of the transverse arches of the vault, the eastern arches having a ribbed soffit, the western arches a hollow soffit; and the tooth ornament occurs only in the western bays. Moreover, convenience would dictate that the eastern bays should be built first, since that could be done without interfering with the services in the Norman choir. Historical evidence points the same way. For miracles commenced at the body of St. Wulfstan in 1201, and he was canonised in 1204, when money would begin to flow in abundantly. Moreover, there was a great and solemn consecration of something at Worcester in 1218 before the young king, Henry III., and a great company of bishops, abbots, and nobles; the "something" that was then consecrated must have been the eastern bays or retrochoir. This being completed, the services no doubt were transferred to it from the Norman choir; the latter was pulled down; and the foundation of the western bays was laid six years later by Bishop William of Blois; the "novum opus frontis" meaning the newer bays which were commenced in 1224, in contradistinction to the bays commenced *c.* 1204. A precise parallel, and a contemporary one, to the course of building at Worcester is to be seen at Rochester.

So much for the value of the evidence of the chronicles, whether positive or negative evidence. It will be noticed that, in respect of Worcester, a new species of evidence was adduced—the date of a consecration. The dates of consecrations, however, are not always of value. We have dozens of examples, English and French, of consecrations which have no reference to the completion of a cathedral or of any important part of it. On the other hand, we know that important parts of cathedrals were completed at such and such dates, and yet no consecration takes place. The fact is, a mediæval cathedral never was finished, and so was never ready for consecration. There was always more new work contemplated; or extensive repairs or reconstructions necessitated by time and decay, or by fire and tempest. Still more remarkable is the incompleteness of the French cathedrals. Where are the seven towers and spires of St. Denis, Laon, and Rheims; the nine towers and spires of Chartres? The result is, I believe, that some cathedrals never were consecrated at all, and have remained unconsecrated buildings to this day. In England it seems to have been felt quite a scandal that services were held to such a large extent in unconsecrated buildings. In 1237 Cardinal Otho, Legate of Pope Gregory IX., convened a council at London, which directed that all churches and cathedrals, "not having been consecrated with holy oil, though built of old," should be solemnly dedicated within two years. It was at this time that Peterborough was consecrated. Evidently we must not lay stress on dates of consecrations, unless they are corroborated from other sources.

We are often told, too, that the monks or canons entered the choir and commenced services in it in such and such a year. From this it is sometimes inferred that the choir was then complete. Such an inference may be incorrect. Services may have commenced as soon as the lower story of two or three bays was ready; a temporary wooden roof being erected over it either at the triforium or at the clerestory level—*e.g.* at Durham so much work might well be done between 11th August 1093 and 6th January 1096; but it is impossible to believe that in these two and a half years there was built the whole of the choir, the crossing, and the exterior wall of the church, throughout the whole of its extent, as high as the top of the aisle arcade which surrounds the entire building from east to west; which is the view adopted by Canon Greenwell.

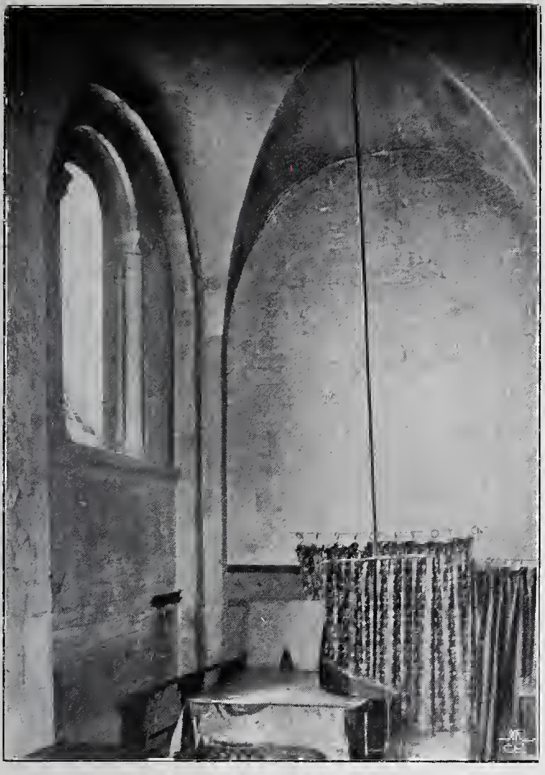
At Peterborough proof positive exists that the monks entered the nave before they built the clerestory. At the foot of the clerestory passage on either side of the nave is a row of holes (not putlog holes), each exactly corresponding to a hole on the opposite side of the nave. Plainly they held the timbers of a temporary roof which covered the nave till the clerestory was built, probably by Abbot Benedict.

But there is one kind of documentary evidence of the utmost value, if we can read it and understand it. It is the evidence of contemporary fabric rolls, charter registers, and the like. Here we have the information at first-hand which we only get second-hand from chroniclers and historians. Archdeacon Freeman says rightly of Exeter, "It cannot be too strongly insisted upon that our supreme and often our sole authority in these matters is the contemporary evidence of the fabric rolls, or other original documents." Unfortunately some are non-existent, others unexplored or unpublished. Besides, it is not easy to read accounts written in Latin, and in such Latin; and full of abbreviations, the latter a fertile source of error. Even if we decipher and translate them correctly we cannot always be certain to what part of the building they refer. Frequently, however, they have been carelessly copied or carelessly printed. There is a classical instance at Lincoln. The manuscript of Giraldus Cambrensis was quoted as asserting that St. Hugh, *c.* 1200, built Lincoln Chapter House, "capitulum." Mr. Edmund Sharpe, the one archæologist who ever upheld the evidence of stones and mortar against that of documents, plumply denied it. On reference to the manuscript it was found that the word was "capicium," the head or apse of the church. It had been carelessly copied by Wharton. So again at Exeter. The fabric roll of 1308, the first year of the episcopate of Bishop Stapledon, gives the various items—red lead, vermilion, varnish, &c.—for the painting of the vault of the choir. On this Leland in the sixteenth century asserts that the choir was vaulted by Stapledon, whereas the plain inference is that if the vault was painted in the first year of the episcopate of Stapledon it must have been built by his predecessor, Bishop Bitton. The historians then may have read original documents carelessly or have remembered them incorrectly. Many of the terms, too, employed are in themselves ambiguous, *e.g.* "frons" may mean either east front or west front. And as at Peterborough there were three west fronts completed or commenced, there is a choice in that cathedral of four different meanings.

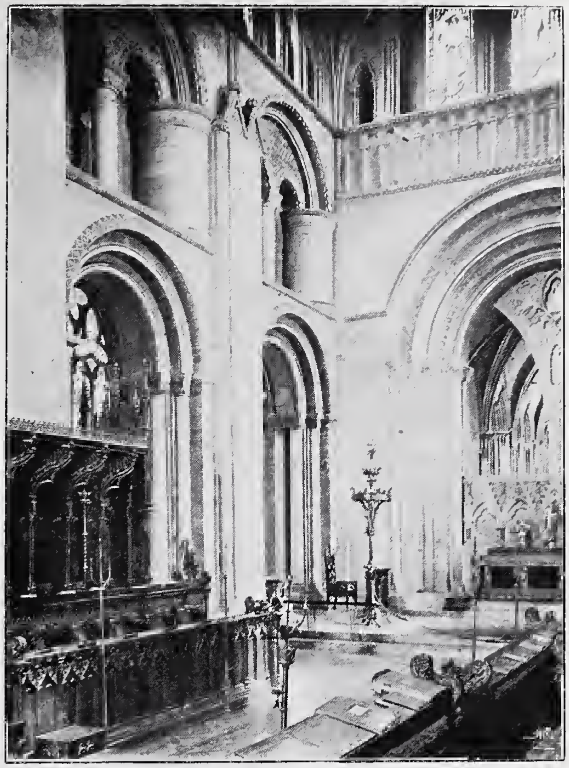
Attention may now be directed to an ambiguous word, "teres," employed not indeed in a fabric roll, but in the chronicle of William of Malmesbury, who records that Bishop Robert de Losinga (1079–1096) commenced a Norman cathedral, "Aquensem basilicam in tereti schemate imitatus." This is supposed to mean that being a native of Lorraine, and acquainted with the Rotunda built at Aix-la-Chapelle by Charlemagne, he commenced to build at Hereford a circular church in imitation of it. But "teres" does not mean "circular;" it is applied to anything smoothed or rounded by rubbing, terendo; *e.g.* to a man who is "in se ipso totus, teres atque rotundus, Externi ne quid valeat per læve morari." It is also applied to any long round object, such as the shaft of a column or the trunk of a tree. With a connotation so vague it is certainly dangerous to build a chronology on its use in the passage quoted above. In that passage two different interpretations are possible. Following the usual interpretation of "teres," the passage may mean simply that Bishop Robert built in dressed stone, not in rough Anglo-Saxon fashion. Taking the other interpretation, it may mean that he built a long cathedral, which was rounded ("oblongus simul et rotundus." Facciolati), *i.e.* it was rounded at the ends, had an eastern apse, and perhaps was intended to have a western apse as well, which would be quite in German fashion, the precise form shown in the ancient plan of St. Gall. But it is unnecessary to go into refinements of philology; as I said above, the chronicler was not an architect, nor writing for architects; nor is it likely that he had ever seen the church at Aix-la-Chapelle, which he says the bishop copied. Sir G. G. Scott, who was exceedingly cautious in making assertions about mediæval chronology, affirmed downright that there is not a single stone left of the eleventh-century cathedral of Robert de Losinga. I cannot help feeling that he was misled by mistranslating the phrase "in tereti schemate." The east wall of the south transept, the pier arcade of the choir, both aisles of the choir, and the Norman sacristy on the south of the choir have all the appearance of eleventh-century work. The south transept has a curiously archaic look. Its arcading, not confined, as usual, to the wall space below the range of lower windows, but carried right up to the triforium, may be paralleled in many early Romanesque designs in Lombardy, such as the façade of St. Sophia, Padua. The balustraded triforium, with its irregular spacing, finds an exact parallel in the undoubted eleventh-century transepts of St. Albans, Chester, and Pershore. It is quite impossible that it can be of the same date as the grand triforium-bay of the twelfth century immediately to the north of it. The misshapen unribbed vault, the rude shaft and base in the window jambs of the sacristy are of the eleventh century. So is the rough masonry of the choir aisles, badly coursed, with wide joints. Still more so are the miserable abortions of string-courses—mere horizontal scratches along the wall—the narrow pudding-bases, and the voluted capital. What seems to have misled Sir Gilbert Scott is that all the interior of the choir was remodelled or rebuilt, probably about the middle of the twelfth century. When the rich Norman nave was completed the builders may well have regarded the archaic choir with disgust. So they built an entirely new triforium and clerestory to the choir, and recarved every capital, with one exception only. In the same way at Romsey nearly every capital in the choir has been recut in the twelfth century. So also at Porchester, where the west doorway and most of the capitals have been thoroughly transmogrified. A still closer parallel is to be found on the south side of the nave of Rochester, where five bays of Gundulph's eleventh-century pier arcade remain unaltered—all the arches square-edged—on the side of the aisle; whereas they have been remodelled on the side of the nave. Here also, as at Hereford, the triforium and clerestory may have been wholly rebuilt. The conclusion seems to me irresistible that we have at Hereford large portions of the eleventh-century cathedral of Bishop Robert de Losinga.

In some few instances mural inscriptions remain. But not even in these can we place implicit confidence. Mr. Barr Ferree mentions an inscription placed by the monks in the Chapel of the Holy Cross at Montmajour to the effect that it was built by Charlemagne. Yet their own archives state that it was erected and consecrated in 1019, as is clearly borne out by its architectural character. (The twelfth-century church of St. Gilles in Languedoc is also attributed to Charlemagne in a Papal Bull of the sixteenth century.) At Clee Church, near Grimsby, is an inscription let into a Norman pier to the effect "that this church was dedicated by Hugh, Lord Bishop of Lincoln, in the year 1192." As a matter of fact it was the choir and transept which were dedicated in 1192, whereas the nave, in which the inscription occurs, was erected some fifty years earlier. So at Castor, near Peterborough, the south wall of the chancel contains a mural tablet stating that the church was dedicated in 1124. But the present chancel is plainly thirteenth-century work.

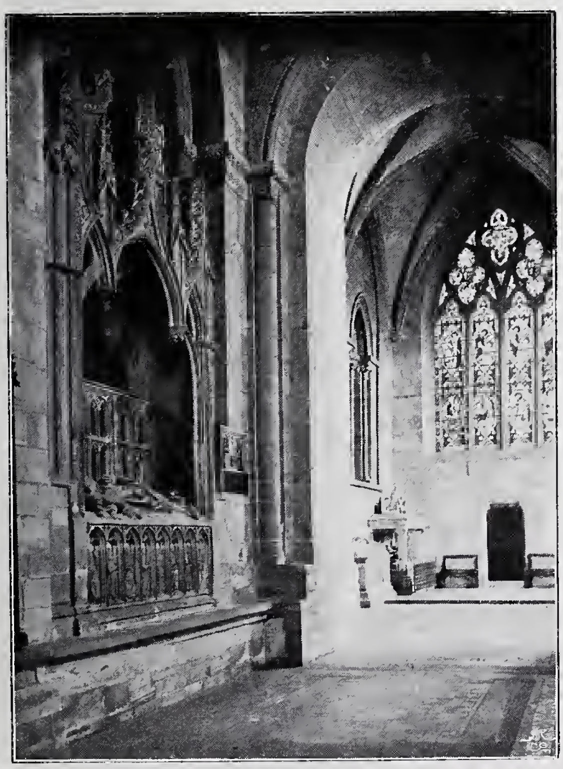
So much for the inherent weakness and liability to misinterpretation of documentary evidence. But it may be asked, supposing that we consent to be guided by architectural evidence, by the comparative rather than by the historical method of investigation—can its conclusions be accepted without reservation? No; certain reservations must be made. They are, however, of minor importance. In the first place it must be remembered that there was not at any time a deal level in mediæval design; we must make allowance on the one hand for stupidity, on the other for genius. In mediæval building committees sometimes Moderates, Conservatives, Obstructives, sometimes Progressives and Radicals were in the majority. In the eleventh and twelfth centuries the monks were the Progressive and reforming party; as superior to the secular clergy in architecture as they were in learning, piety, and morals. In Gothic times the rôles were on the whole reversed. The monks remained for the most part contented with their grand Romanesque churches. They had been bred in an atmosphere of



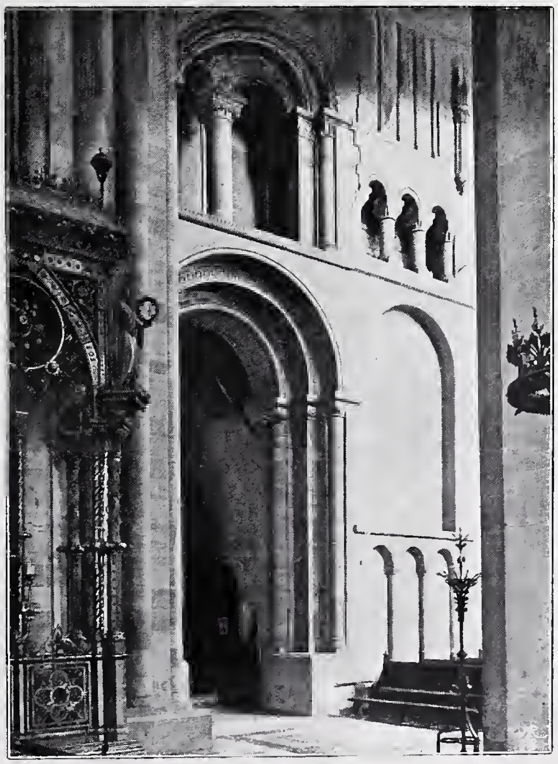
Sacristy.



Choir—North Side.



South Choir Aisle.



South Transept—East Side.

HEREFORD CATHEDRAL.

Romanesque; Gothic to them was an interloper and unwelcome. The monks of Peterborough and Norwich retained their Romanesque minsters almost unaltered to the last. On the other hand, the canons of Lincoln, York, Lichfield, and Exeter swept almost every trace of Norman work from the face of the earth. There is a remarkable difference in the work that was done by Bishop Fitz-Jocelin in the secular cathedral of Wells and the work that was going on simultaneously on the other side of the marsh at monastic Glastonbury. A certain allowance, then, must be made for the inherent conservatism of human nature, and especially for that of the monks of the thirteenth century. An amusing example of the conservatism—or shall we call it the pig-headedness?—of the monks occurs at the great abbey church of St. Germer, near Beauvais. It was evidently built well on in the twelfth century; and the designer was acquainted with the latest developments of architecture, *e.g.* with the work of Suger at St. Denis (1140–1144). He sees the constructional advantages of Gothic; he points the arches of the pier arcades and of the aisles to facilitate the vaulting; but not another pointed arch does he admit in the building. All the windows are round-headed; the arches of the triforium are semicircular, and enclose minor semicircular arches; and the chevron is preferred to the tooth ornament. Externally all is Romanesque; Romanesque so refined and beautiful—witness the corbel-table—that the work must be placed quite late in the twelfth century. The same is the case in Oxford Cathedral. Though it was built late in the twelfth century—it was commenced in 1158—choir and transepts are thoroughly Romanesque. The architect ignored—he could not have been ignorant of—the improvements of the Gothic builders—with one exception only. The transepts, as at Wimborne, are narrower than the nave and choir; and it was necessary that the four great arches of the crossing should rise to the same height. At Wimborne Minster the builders got over the difficulty by making the broad arches segmental and the narrow arches stilted semicircles; but at Oxford, as at Bolton Priory, a more scientific method was adopted: the broad arches were made semicircular, the narrow arches were pointed. There was even in some monasteries an inherited conservatism; the monks of Peterborough not only kept Gothic out of their nave to the last possible moment, but failed to provide their apse with an ambulatory till the end of the fifteenth century, and never vaulted their church. Of all monasteries that of Peterborough was the most unprogressive. Norwich too ranks high among the unprogressives; the monks did indeed eventually vault the whole cathedral, but only because fires in 1463 and 1509 burnt down the roofs of nave, choir, and transepts, and impressed on them the necessity of making the building fire-proof.

Again, there was one period—I think one only—the first half of the fourteenth century, when English architects showed some reverence for old work and refused to impair the effect of good old design. When they had to continue an older building—if it was of good design—they assimilated their work to that already in existence. If, then, because the clerestory has lancet windows we were led to believe that the eastern bays of the south side of St. Albans nave were erected in the first half of the thirteenth century, we should be much mistaken; they are a whole century later. So also, in the first half of the fourteenth century, Beverley assimilated its nave to the thirteenth-century choir and transept; Westminster did the same. Ely, though triforiums had gone out of fashion, built a big triforium, not to disturb the lines of the lovely presbytery. Carlisle carried the thirteenth-century arcade of the aisles round the east wall of the fourteenth-century extension of the choir. Other instances might be given. None of them, however, present the slightest difficulty to the archæologist. For the fourteenth-century builder kindly put his own trade mark on the detail. At St. Albans fourteenth-century rosettes replace thirteenth-century dog-tooth. Beverley and Westminster naves have the caps and bases of their own period. There are, however, two or three examples which rather closely approach what is called "architectural forgery." At

Rochester, late in the thirteenth century, the monks in rebuilding a bay of the triforium carefully copied the twelfth-century design. But, as they built in a different stone—greensand—the archæologist of the future would fall into no error. So in Durham Galilee; Cardinal Langley, in the fifteenth century, in adding two more shafts to each pier, copied exactly the earlier shafts even to the bases and caps; but he built the new shafts in stone, so that they cannot be confounded with the older shafts, which are in Purbeck marble. The most remarkable example of "architectural forgery" I have met with is at Bristol, where the lower part of the great gateway in College Green was rebuilt, probably in the sixteenth century, in the style of 1150. Mr. Godwin says, "Although it presents a fair specimen of rich Norman work, and probably retains its original proportions and design, there are one or two minor points which are scarcely what we should expect to find in Norman work, and which, combined with the exquisite 'finish,' indicate the reconstruction of this gateway as among the latest ante-Reformation works in progress. Thus the hood mouldings which surround all the arches are not only of Perpendicular section, but at the

THE CHURCH OF OTTERY ST. MARY.

crown of the arch are mitred into the confessedly Perpendicular string-course, which is of the same section; whilst the jointing of the masonry in the south-western jamb is not continuous, but the outer order breaks joint with the other, and the courses are nearly double the usual height of Norman masonry; so that the so-called Norman gateway of College Green is no Norman gateway, but a Perpendicular restoration of the old work." Even in this extreme instance, then, there is plenty of detail to prevent the archæologist from misinterpreting the evidence of the architecture; there is no reason why he should go wrong in the rare instances in which a mediæval architect has not worked in the style of his own day.

One example there is, however, of belated design: it is the remarkable church of Ottery St. Mary, which can only be understood on the supposition that Bishop Grandisson's architect, who commenced it *c.* 1330, was a mediæval "crank" who went out of his way to bewilder antiquaries by designing the interior in the style of his own day, but the exterior, for the most part, in the style of the earlier work of the preceding century. Looked at from the outside, with its single lancet lights in towers and aisles, and its grouped lancets in east and west front, it has constantly been mistaken for a thirteenth-century church—that dedicated by Bishop Bronescombe in 1259—remodelled and enlarged by Bishop Grandisson. It is nothing of the sort. It is all Grandisson's work. The architect has amused himself by perpetrating forgery. Yet he has not left the archæologist without a clue. The lancets, for example, are not the lancets of thirteenth century church windows, but the narrow slits in the walls of such castles as that of Helmsley, Yorkshire. Ottery St. Mary, so far as I know, is a unique example of a church deliberately designed in the spirit of a bygone style.

But we may be misled not only by the stupidity and backwardness but by the precocity and cleverness of a mediæval designer. A designer might be *before* his time. He might be so much ahead of his contemporaries that no one would have anything to do with his work for a long time. This is borne out by facts. Generally any improvement in construction, in planning, or in ornament spread like wildfire. But there are instances to the contrary. Here and there a great original genius sprang forth, and the world was not ready for him. Such was Suger's architect at St. Denis, who gave the world fully developed and harmonised Gothic construction in 1140. Almost a whole generation passed before the Ile de France generally reached his level; nearly two generations passed before we produced the choir of Lincoln Minster. Or look at St. Urbain, Troyes. The date of it is certain, for it was commenced by Urbain, after he had become Pope, in 1262, on the site where his father, a shoemaker, had worked in his shop. Yet in construction and ornament it is a church of the fourteenth century; it represents the full and final consummation of Gothic architecture which other people did not reach for more than a generation. We have a most remarkable instance of precocious genius in our own country at Gloucester. Everywhere else in England, between 1330 and 1350, architects were designing in flowing lines: they were building Ely octagon, choir, and Lady-chapel; the presbyteries of Wells and Lichfield; Heckington, Ewerby, and Patrington Churches; the Percy shrine at Beverley; Edward II.'s monument in Gloucester itself. But the Gloucester masons were remodelling the south transept and choir of the Cathedral in the Perpendicular style. They had finished it even to the vaulting and glazing by 1350, for the glass of the great east window is not later than that date. We know of no other Perpendicular design till the work of Bishop Edingdon in his native church in Wiltshire and in the western bays of the nave of Winchester (1352–1361). The Gloucester masons, then, were nearly a whole generation ahead of their contemporaries. Most frequently the antiquary antedates his buildings; it is possible that sometimes he may postdate them; not so very often, however; precocity of genius never was very common in the history of the human mind.

With these and such reservations I believe that it is nowadays safe to rely primarily on architectural evidence. I will support myself by the authority of Mr. Barr Ferree, who has done so much for the chronology of the French cathedrals. "Fortunately," he says, "modern archæology does not depend wholly upon written records. The analysis of buildings and parts of buildings, the study of ornament and of constructional features, enable the modern student to determine the relative age of buildings within one group. This comparative study has thrown much fresh and valuable light upon the chronology of mediæval buildings." Still more emphatic are the words of Mr. Edmund Sharpe, who in his own investigations ever set architectural evidence first, and whose conclusions I have constantly found of scientific precision and accuracy. In alluding to the antagonism which not seldom arises " between the internal evidence furnished by the building itself and the external evidence of contemporaneous history," he says that "in the earlier days of archæological study the tendency was to discredit the former and accept the latter; in these days the results of strict analytical investigation and comparison of the minor details of the buildings of the Middle Ages dispose us to place much more reliance upon this species of internal evidence than on even the most unequivocal assertions of ecclesiastical historians. The inductive reasoning based on the former appears to be safer than the possibly hearsay testimony of the latter." Therefore, as I said before, study the architectural *before* the documentary evidence; and if the former conflicts with the latter, let the latter go to the wall. It may be objected that if the chronology of the cathedrals is in future to be based primarily on acquaintance with constructional detail and in particular with mouldings, every archæologist will have to serve an apprenticeship in architecture. That is true. The millennium will not be reached in ecclesiology till archæologists are architects and architects archæologists.

DISCUSSION OF MR. BOND'S PAPER.

Mr. H. L. FLORENCE, *Vice-President*, in the Chair.

THE CHAIRMAN read the following letter from the Bishop of London, addressed to the Secretary:—

Fulham Palace, S.W.: 18th November, 1898.

MY DEAR SIR,—I am sorry that a previous engagement will prevent me from attending the Meeting of the Royal Institute of British Architects on 21st November. I am obliged to you for sending me Mr. Bond's very interesting Paper. Its main contention is that documentary evidence needs criticism in every case—and it is obvious that internal evidence supplied by architecture is one element in this criticism. The strength of this internal evidence grows by the continued application of the comparative method. It is much stronger now than it was thirty years ago. But I do not think that its results destroy the credibility of documentary evidence, but only teach us to interpret more accurately the exact meaning of the words, and discriminate between an exact and an approximate statement.

Yours faithfully,
M. LONDON.

MR. W. H. ST. JOHN HOPE, M.A., who rose at the Chairman's invitation, said:—I should like, Sir, to propose a vote of thanks to Mr. Bond for his very excellent Paper. I have had the temerity, although I am not an architect, to write, and lately to re-write, the architectural history of one cathedral, and I have reviewed the architectural history of several others, for my own benefit and, I hope, instruction; and I am, therefore, very much interested in the subject which Mr. Bond has so ably expounded. Mr. Locke was good enough at my request to send me a copy of the Paper, in order that I might look it over beforehand. I do not go the length Mr. Bond does in criticising the opinions of our predecessors. It must be remembered that Professor Willis published his *Architectural History of Canterbury Cathedral*, a distinctly monumental work, in 1845, at a time when our knowledge of architectural detail, or capacity for dating buildings, was not so advanced as it is now. In the fifty years that have elapsed since that book was written, we have learned a good deal, and have been able to "stand on the shoulders" of Professor Willis and his school, and to see a great deal that they were not able to see owing to their lack of facilities. I myself, for instance, have had an opportunity that Professor Willis had not of going through the whole of the account rolls and registers of the Cathedral Church of Canterbury; and when I tell you that the series of rolls of accounts is fairly complete from 1207 down to the Reformation period, and that the registers cover the same period, it will be understood that there is a great deal of matter in them that was unknown to Professor Willis, and that there are certain statements in his book that can be now revised. The interesting point about Hereford which Mr. Bond mentioned was pointed out so long ago as 1871 by Mr. Gordon Hills, but the story still goes on that Bishop Swinfield, and not Aquablanca, built it; and we are still being told that cross-legged effigies are Crusaders, that low side windows were made for confession or for the use of lepers, that the crosier is a cross, and that drains are subterranean passages leading from some impossible place to another. When these things get into print, it is most difficult to get people to hold what we should call the right view. I picked up only two or three days ago a perfectly new work and one of the first things I lit upon was a picture of a cross-legged effigy who was called a Crusader; and a chapter devoted to the symbolism of the cross, in which the crosier, of course, was a cross, and the actual crosier was a pastoral staff. In reference to the dating of things wrongly, as at Hereford, there is also a very curious example in connection with Canterbury, which points to one of those likes and dislikes referred to by Mr. Bond. Professor Willis has dated the nave of Canterbury as starting with a mandate of Archbishop Sudbury to the clergy in 1378; but in one of the registers is a list of subscriptions for that identical work which was made in 1369, in the time of William of Wittlesey, who has not been counted a benefactor to the fabric at all. Then we are told that Archbishop Sudbury built the two aisles; and we know from the heraldic and other evidence that the work was still going on at the close of the century, into Arundel's time and that of Chillenden. Yet in the *Kalendar of Obits*, one of the Canterbury books, it will be found stated, in connection with Chillenden, that by the wealth and help of Thomas Arundel, he, Chillenden, had totally renewed the whole of the nave, as well as the Lady Chapel. That was evidently because Arundel had given 1,000*l*. to it; but Richard II. had given 1,000*l*., and so had Courtney before; yet Arundel, who was a great benefactor in other ways, poses alone as the rebuilder of the nave, which was probably begun soon after the 1369 subscription list, whereas Chillenden did not become Prior until 1391. There is a similar statement with regard to the central tower in connection with Prior Goldstone, who died in 1517, and is said to have built it; but the tower was actually begun in 1433, as we know from other evidence. With regard to a wrong reference to parts of a building, that is a matter in which we should deal kindly with our predecessors, because, as I have said, we have had advantages in reading things by the light of more recent learning, which was overlooked at the time. A case came under my notice a short time ago with regard to Winchester. There is an entry about the beginning and finishing of a new tower in 1200, which Professor Willis has expressed his inability to explain. He had previously made up his mind that the west front was flanked by two western towers, as shown by certain foundations underground to this day; but it did not occur to him that it was quite possible that, like other churches in this country, Winchester did not have two western towers, but only one; that in fact it resembled Hereford as it was over a century ago, and as Ely is to-day; and as Walkelin, the Bishop who planned Winchester, was brother of Abbot Simeon who planned Ely (and Professor Willis had already called attention to the similarity between the two plans), it is somewhat curious that he should not have thought of that fact also. Then it is very necessary, if I may speak from my own experience, to see what is the original text of so many of these statements. Mr. Bond has referred to the inaccurate statements of Wharton and others. Of Wharton's inaccuracies and omissions I have corrected a number myself. Only a short time ago I wanted to check some statements concerning the later work at Rochester, which Wharton had quoted from a chronicle in the British Museum. In collating these I found a remarkable passage, which seemed to be something quite new, to the effect that on a certain date, Bishop Hamo of Hythe, of Rochester, at the invitation of the Abbot and Convent, had gone down to Battle Abbey and consecrated seven altars. This seemed an interesting fact, and I wondered why I had not noticed it before. So I turned to Wharton to see what he said. He gives only one item in 1332, and says that many other things were done in this year by the Bishop, but they were of no account. It so happened that that particular entry is of great account, because one of the facts about Battle is that the church was undoubtedly built upon the site where Harold fell at the famous battle of Hastings; and you are shown at Battle a barren, rocky platform, said to mark the spot, beyond which are three crypts. If these are examined, it will be found that they are not of the Norman period at all, but that they belong to the fourteenth century. Now, as those three crypts each contained an altar, it is reasonable to assume that the chapels in the church above each contained an altar—that would make six altars; and just immediately to the west there must have been another large altar in the church above, which would make the seven altars consecrated by Hamo in 1332. So we must not look to that particular platform for the place where Harold fell, but to another, some feet to the west, where the high altar would have stood. Everybody up to now has looked upon that platform as marking an important epoch in English history, which these little architectural features show must have occurred somewhere else. As to architectural forgery, there is a curious instance near at hand, though perhaps not very well known. In the north-west corner of the cloister at Westminster there is actually wrought out of the same block and at the same time an Early-English capital, as we call it, and one of the Perpendicular style; but both were done in the Perpendicular period and not in the thirteenth century. In connection with architectural forgery so-called, the re-use of old materials must also be borne in mind. An interesting example exists in the little church of Catterick, near Richmond, in Yorkshire. We know all about that church, because the contract for the building exists. I once went over the building with the contract in my hand, and compared the contract with what was referred to in it. In the church there were two windows that could not have been built at that time. The church was rebuilt in the fifteenth century, and these windows were of the fourteenth century, and there was nothing about them in the contract. The explanation was clear enough. The old church, which was on another site, was pulled down, and these windows taken from it and put into the new building in order to save money. That is an instance of a building appearing to be much earlier than we should think it was by the historical evidence. We must not neglect the historical evidence altogether, because the very early date, as Mr. Bond has said, of that beautiful fourteenth-century work at Gloucester rests entirely upon the statement of Leland, which is quoted from other chronicles. There is a precisely similar instance recorded by Matthew Paris. While Matthew was alive—and he must have been talking of what he knew—there was a certain Prior of Binham in Norfolk, a cell of St. Albans. This Prior went there in 1226, and left in 1244 to go to Tynemouth. Matthew Paris gives a list of the architectural works that he did before he went to Tynemouth, and one was that "he built the front of the church from the foundation to the roof." I happened to find that quite casually in looking over Matthew Paris's history before paying a visit to Binham, and naturally I looked for the building that the entry referred to, and to my amazement I found a beautiful geometrical front, of, I should have said, from 1270 to 1280. This was apparently the very thing that Matthew Paris said was built by a man who went away from the place in 1244. It must have been this part of the building, because the other end of the church, although it was in ruins, was not of that period at all; and here is this very fine front not only taking in the end of the nave, but the two aisles as well. In conclusion, I should like to ask a practical question as the outcome of this Paper, viz. whether the time has not arrived for a new edition of Rickman—I do not mean necessarily the book *Rickman*, but, using it simply as a name, we want a list of dated examples in architecture re-arranged chronologically, and not by mere guess-work. Let us have the documentary evidence for a building; and the contemporary evidence—for I think it is very important that Professor Willis's term "contemporary" documents should be borne in mind, and that we should not have to believe the rubbish of Godwin and later writers, who, as Mr. Bond has pointed out, wrote of a period they knew nothing about. I think we might also very fairly now revise the architectural history of all our great churches. I have the material for doing Canterbury myself, and there are other people who have, no doubt, the same for other churches. The history of Durham can be largely re-written, because quite lately the whole of the account rolls, many of which I have read myself, have been gone through, and are being issued in print by the Surtees Society. Three points ought to be borne in mind in working out the stories of these great buildings. The first is the manner in which they were reconstructed. When the old men began to reconstruct an old church they generally began on a definite plan. If you take a series of plans like those so admirably produced in the *Builder*, and colour them all historically, blue for Early English, yellow for Decorated, and red for Perpendicular, you will be astonished to find what a number have a blue east end, and how the work goes along gradually from east to west. If the many historians who have written about Wells before Canon Church had adopted that principle, the whole thing would have been as clear as could be to them; for you have only to go over Wells to find that it was built in the regulation way from east to west; and having got to the west they began again at the other end. Then there is the question of lengthening the churches—why was that done? In some cases it was done on account of adding a Lady Chapel; but in others, I believe, it was done to permit the erection of the great standing shrines that were the ornament of so many buildings in this country. At Canterbury Gervase expressly tells us that the beautiful appendage at the east end of the church was erected to hold the shrine of St. Thomas. When the building was finished, with its lovely floor and everything else, they translated the saint's shrine into it. People at Canterbury often call that beautiful chapel the Trinity Chapel; but if you read Gervase you find that its proper name, the name by which it is always known in the records, is the Chapel of St.

Thomas, while the Trinity Chapel is that curious round one at the east end, and not the large one west of it. There is one last fact to be borne in mind, which is responsible for a great deal more than is usually attributed to it, and that is the pause made in building work in the fourteenth century owing to the Black Death of 1349. Professor Willis, writing of Winchester, is inclined to date the beautiful Decorated work of the Presbytery as 1320, and later; but if you look at the two eastern arches, with that lovely screen wall with niche work in it, it is evident that a pause of some considerable length must have occurred before they went on, and that when they did they worked in a more timid fashion. I am convinced that the date at Winchester must be put later than 1320, and that the work was stopped by the Black Death of 1349; and that it was after the Black Death, when they had sufficiently recovered themselves, that they rebuilt the arches of the presbytery, though they had not recovered enough energy to build the aisles with them. There are a number of other instances that might be quoted in support of this, and it is interesting to note, too, that this period agrees with that conservative one which Mr. Bond mentioned as being in existence in the fourteenth century.

Mr. WILLIAM WHITE, F.S.A., [*F.*] in seconding the vote of thanks, remarked that he was glad that the lecturer had given such good reasons for depending so much more on the architectural evidence than on the documentary or the traditional. There had been numerous instances of conflict of opinion with regard to the dates of buildings, and he had found that antiquarians and historians would not only depend upon the documentary evidence, whatever it might be, but set aside and spurn the architectural evidence. Comparatively few antiquarians knew enough of architecture to draw the deductions that had to be drawn from architectural evidence. He held strongly with the lecturer as to the structural evidence in establishing chronology. The Galilee of Durham was one of the most remarkable instances of that. According to the documentary and traditional evidence, Bishop Pudsey built it as a Lady Chapel. But the architectural evidence pointed positively to its having been built by Bishop Pudsey for his court of judicature, when he was appointed King's Commissioner with the King's writ. This evidence was so clear that he could not understand why it had escaped analysis so long. Coming from the nave of the cathedral through the western portal into the Galilee, there was a Latin inscription over the door calling attention to the righteous judgments to be passed there; and then there was the altar of Our Lady of Pity, which tradition said had its original reredos. The reredos, it was true, was of Pudsey's date; but what was the reredos? It could not have been a reredos to an altar; but it could have been at the back of a seat of judicature, because there was evidence relating to that, and this painting at the back of the reredos was the painting of a curtain, with a handsome broad decorated band across the spring of the arch. Further, on the jambs on either side there were figures of the King and the Bishop, representing the combined authority of the King and the Bishop—in this Court the Bishop being not only the King's commissioner, but Bishop and Prince Palatine as well. That was a remarkable instance in support of Mr. Bond's principle of appealing to the architectural evidence. Then again as to the name—the Galilee. What did it mean? There could be no question about it. It was sometimes called the Galilee of the Gentiles—that is to say, it was outside the cathedral; it was the outer court of the cathedral, like the outer court of the Gentiles at Jerusalem, which was accessible to all alike, and not simply to the parties in the ecclesiastical causes tried there. There were several traditions as to the reason of the name, the guide-book stating one to be that when a monk wanted to see a female friend she was told "He has gone before you into Galilee; there you shall see him." To give that as a reason why the Galilee should have been built as it is, is simply ludicrous. There were several instances of the documentary coming in conflict with the architectural evidence, and giving rise to misconception, even at St. Albans. The eastern bay of St. Albans had an original Norman corbel-table which came in line with its Norman roof. It was constructed with the same brick, with the same mortar, and with the same workmanship as the work below it. The clerk of the works (acting probably by authority) had it removed, and the modern fourteenth-century corbel-table carried on up to the tower; and he repudiated the idea of its having been the original corbel-table, pointing to the historical evidence that the wall was raised seven or eight feet in the fourteenth century! But where was there a sign of that? If it were put on the top of a wall raised seven or eight feet in the fourteenth century, what became of the clerestory window below it? There was, again, no sign whatever of there having been such an alteration.

Mr. H. HEATHCOTE STATHAM [*F.*] desired to draw attention to two points with regard to the subject. He was entirely in agreement with most of what Mr. Bond had said, but they ought not to forget that, after all, it was originally from documentary evidence that they got the basis for following the history from the architectural evidence. Imagine a man from another planet put down before the Gothic monuments of England, and told to work out their history. He could no doubt, after some attention, trace the succession of styles; he could make out that the round arched Gothic came before the pointed arch, and so on; he would very soon find out, probably, that the Perpendicular was the last, and so forth; but he would depend upon documentary evidence for getting precise dates. It was something like surveying; they could triangulate all over the country, but they must have the measured base-line to start from; and the chronology of styles could not be worked out unless there were some precise dates to start from. Then the two reacted upon each other. Full value should therefore be given to documentary evidence in the first instance, for we could not have begun without it. Mr. Bond, however, had ably shown that there were places in which the architectural evidence was more reliable. Mr. Bond began by a reference to a controversy that sprang up a little while ago—it was in fact a revival of a controversy that had been going on for many years about Waltham Abbey. That controversy interested him (the speaker) very much, and he spent an afternoon in studying Waltham Abbey in connection with the correspondence on the subject, and he came to the conclusion that the theory that Harold built that nave was absolutely untenable. Yet there could be no doubt that Harold did build an abbey church at Waltham, and the argument of Freeman and others was that it was most improbable that the Normans should have pulled down that church after it had only stood a short time, to build another on its site. But the facts proved absolutely that they did do so; and that fact it might be important to bear in mind in considering other cases in the history of buildings. One could not argue safely that people could not, or would not, possibly have pulled down such-and-such a thing, when it is proved that they did so on an occasion when it would have been thought very unlikely. And that argument might be applicable in other cases. He should like to join his expression of opinion as to the very great ability and interest of the Paper they had listened to that evening.

Mr. E. W. HUDSON [*A.*] desired on behalf of the Associates to express their gratitude to the reader of the Paper for the most interesting, elaborate, and important discourse they had had the pleasure of listening to, and, he should also add, for the beauty and number of the views that they had looked upon with so much pleasure. He had intended to say a few words with regard to the universal application of the principle of combination of documentary and ocular evidence, not only with regard to English cathedrals, but also with architecture and antiquities generally; but he would refrain from doing so at that late hour, and make what few remarks he had to make in writing to the Secretary if he should think them worthy of space in the Journal.

Mr. BOND, in reply, said that he came before this learned Society with his maiden paper in great trepidation, and he was only too thankful that he had escaped their criticisms so lightly. He might, perhaps, say a word or two with regard to some of the remarks which had been made. There was a still more remarkable example than Waltham, and that was the extraordinary craze which represented Oxford cathedral as largely the work of the Saxon King Ethelred and as having been built in the year 1004, which occupied nearly the whole of the most recent guide-book, and was probably the largest mare's-nest in archæology. With regard to what Mr. White said of the Galilee, he could not go into the question whether it was a Lady Chapel or not; but certainly before 1186 there was a grant made in which the phrase occurred: *Sub altare beatae Mariae in occidentali parte ejusdem ecclesiae quae Galilea vocatur;* so that there was an altar of the Blessed Virgin in the present Galilee chapel pretty early. Why it was called the Galilee nobody seemed to know. He had an idea that a large amount of half-ecclesiastical and half-secular business went on in all the great churches; it was somewhat secular for instance, to pay tithes, and it was not altogether ecclesiastical to get married. Part of the ceremony of getting married, and the whole of the ceremony of paying tithes, was conducted in some part of the church, which, if not the Galilee, formed a sort of semi-sacred part like the Galilee. And that was the reason, he thought, why our cathedrals and parish churches had such enormous porches. Wells, for instance, where the west portals were little better than rabbit-holes, not being able to build a Galilee, had to build a large north porch. On the other hand, in French cathedrals, the west portals were on a huge scale, and there the porches were omitted very often. That looked as if the porch might be a substitute for, or used in a similar way to, the Galilee. That was mere conjecture. Mr. St. John Hope's remarks were, as usual, of the greatest value and from original sources. One reason why the churches were enlarged so much in the thirteenth century was, as had been the case at Canterbury, that, whereas many shrines had hitherto been kept in crypts, at that time there was an enormous increase of saint-worship as of mariolatry, and the crypts became unable to hold the hundreds of thousands of pilgrims who came to them to look at the relics and say a prayer before them. For instance, though Canterbury crypt was such a vast one, they had to remove the shrine from the crypt to the floor of the choir above. The increase of pilgrims was, then, one reason why the churches had to be enlarged so much. Wherever there was a first-class saint—for instance, St. Ethelreda at Ely, St. Hugh at Lincoln, St. Chad at Lichfield, and St. Cuthbert at Durham—or where they could manufacture one—they made a Scotch baker at Rochester into St. William of Perth—there they had such crowds of pilgrims and such a wealth of offerings that a great extension followed at once in the shape of a Lady Chapel, a retro-choir, or an eastern transept. Mr. Hope's reference to the Black Death was interesting and important. As he had pointed out in the Paper, the Perpendicular was started at Gloucester when everybody else was doing Curvilinear work, which was a much more beautiful thing, *e.g.* at Ely. The question is, why did the fourteenth century give up this beautiful style of its own, and adopt the more or less debased style (following the words of the common handbooks) of the Perpendicular—why did they give up the good for the bad? They gave it up because it was cheaper to do a large building in Perpendicular than in the rich and lovely style of the Ely Lady Chapel. The reason why their artistic instincts had to be violated was that the Black Death had made every one so short of money; otherwise people might have gone on with the Curvilinear, as they did in France; they would never have had the Perpendicular, but would have gone from the Curvilinear to the Flamboyant, which had been well described as Curvilinear gone mad. In conclusion Mr. Bond expressed his obligations to the Rev. F. B. Dickinson, Ottery St. Mary; Alfred Watkins, Esq., and J. Hartree, Esq., Hereford; and R. H. Murray, Esq., Worcester, for the use of photographs and lantern slides.

Mr. E. W. Hudson [*A.*], in accordance with his proposal expressed at the meeting, writes:—

In reviewing the errors, unjustifiable deductions, anachronisms, and forgeries referred to by the reader of the Paper, an architect would probably be forced to exclaim, "Who is sufficient for these things?"—sufficient to arrive at a wise judgment upon the date, origin, or designer of a given building, or part of a building, of ancient date. So multifarious are the points to be taken into account, that a modest antiquarian may well share such a feeling.

The comparative value of documental and ocular evidence, so ably put before the Institute by Mr. Bond, has, I feel sure, a far wider application than merely to English cathedrals; and I suggest that it applies to all antiquarian research. Archæology is not an exact science, and in no other perhaps is greater divergence of opinion to be met with. To enter upon an investigation biased in mind, or determined to find a preconceived result, is often a characteristic of the antiquary, and it generally leads to erroneous conclusions. If we only kept an open mind it would prevent wrangling in trying to maintain an impossible position, or the mortification of finding one's "Roman inscription" to be only a boundary stone of modern date bearing the mark of some contemporary Wm. Stumps!

In observing and comparing records with actual work, it is wiser to avoid all dogmatism, and to maintain a modest reticence in suggesting deductions from the evidence obtainable.

Ancient documents may often help, but, nevertheless, are as often misleading, especially if carelessly consulted and not compared with the building to which they refer.

To take a notable instance. The authority of the Venerable Bede, living in the north, connected with the Northern Church, and reliable to a great extent as to its history, must be open to considerable doubt when he refers to ecclesiastical events in the churches of Kent and Wessex, for he would write from hearsay; whereas Gildas, being a southerner, is more reliable in regard to the southern churches, for he wrote from local knowledge, and as one living in their neighbourhood.

In drawing inferences even from contemporaneous documents much judgment is required. Take, for instance, those that inform us of an event in the life of Chaucer the poet, viz., his appointment as clerk of the works to Richard II. in 1389. It would be a mistake to assume that he was ever to be seen examining materials or checking day-work accounts at Windsor Castle, or setting out tracery, as we may be sure would be a correct surmise in the case of the practical man, Wilars de Honecort. Chaucer's only drawings would be the emolument attached to his office, and his work was no doubt done by a deputy.

Early writers are carelessly copied or translated by later ones, are added to, and fancifully paraphrased, often without any acknowledgment. Even in modern times, when the remains might be examined, writers content themselves with repeating the opinions of their predecessors, and often apply them to the wrong building. I have mentioned a case where a note of Fitzstephen to a London relic has been applied by an annotator to another two miles away, and Fitzstephen has been assigned a period in the seventeenth century, five hundred years after his death! *

Mr. White has mentioned the value of inscriptions upon buildings, as at Durham Galilee. Antiquaries of repute sometimes make very erroneous assumptions in reading these, *e.g.* Mr. Grose, examining an undated slab in Lincoln Cathedral, found the words, *Richardus quondam Episcopus Lincolniensis.* He at once assumed it to indicate the sepulchre of Bishop Richard Gravesend, and wrote that he died in 1279, whereas the fact was that this prelate was translated in that year to the see of London, lived till 1303, and was buried in Old St. Paul's. The stone, therefore, was but a memento of his tenure of office, or else referred to a previous or subsequent bishop of the same name.

It was unwise to base a great theory upon two or three isolated words, as was often done. The practice of seeking to antedate a building, and to seek novel and extravagant explanation for some feature in an ancient building, had latterly been in vogue. Two or three supposititious examples would bring us to the *reductio ad absurdum—e.g.* the pointed arches at Arpino being the work of the Crusaders; the raised terraces of Mexican temples being copied from Birs Nimroud, and the work of Assyrians after a successful invasion of the country; the existence of pointed arches and Early-English-shaped lintels in the Palace of Diarbekr, in North-West Assyria, indicative of an occupation of the country by us 900 years after erection. Many others suggest themselves.

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* R.I.B.A. Journal, 3rd Series, Vol. V. p. 237.

It would seem, from the investigations in progress by the Society of Antiquaries, and those of the reader of the interesting paper we have listened to, that a higher criticism is being applied. Still, it is not likely that the valuable work of antiquaries of the last and present century will ever be underrated. We owe them a deep debt of gratitude for what they have put on record, and their opinions are worthy of all respect. Then it is pardonable that French antiquaries should wish to prove that Saint-Front of Périgueux was the prototype of St. Mark's, Venice, and not *vice versâ*, and one might patiently consider any evidence offered. Sometimes a far-fetched theory is correct. Mr. Tavenor Perry once gave us an instance.† In the Cathedral of Lund, in Sweden, there are details and evidences of eleventh-century work which resemble those found in an English church at Dinton, in Buckinghamshire.

Now it is most unlikely that a Martian projected upon our planet, in the way suggested by Mr. Statham, would, even if he happened to notice this resemblance, conclude that both buildings were designed by the same architect (Donatus by name); and yet I understand that it is so established by documentary evidence, which in this case throws light upon the ocular evidence, and practically sets the matter at rest.

It is very much by mouldings that we seek to fix dates; for Mr. Bond has shown that general arrangements of a century earlier were occasionally maintained by cathedral architects. Yet it seems they were also given to freaks of working in a past style, so that great care has to be exercised before a decision is arrived at. Then, there are cases in parish churches where the nave piers and aisles are later in date than the clerestory wall, for when the single-cell building became too confined for worshippers, aisles were added, and the original outer wall cut through for piers and arches; hence the spandrils and superstructure are considerably older, and are not to be confounded with the lower work.

Heraldic devices and rebuses are of great utility in fixing dates and names of founders. Dilettante writers often get astray in the matter of dates. During the Gothic revival, the *Quarterly Review* made fierce attacks upon Sir G. G. Scott's work, and fell foul of the altar-screen in Westminster Abbey. Sir George merely said one evening at the Institute, "He should not say anything in defence of the design, he considered it very beautiful, and it was erected *temp.* Henry VI. !"

It has been said that the Royal Institute is too much given to antiquarianism. I will not go into the question, but I feel sure, if there had been more architects in the antiquarian camp, there would have been less work for the new criticism.

What might I not say as to the difficulties of future antiquaries in dating work of the nineteenth century! The passing generation has been dubbed "clever forgers," and it is possible their work is so true that it might be taken for that of the thirteenth and fourteenth centuries. But in regard to that of the last quarter, I think there is less fear of mistake, as it affects the Perpendicular style, which Mr. Bond does not seem to hold in great esteem. Certainly, the weak mouldings, the tracery—"curvilinear gone mad" it sometimes was rather than Perpendicular—battlemented churches, with effect of "streaky-bacon" aspect in red and white, samples which one regretted to see, might be trusted to attest to the beholder, A.D. 2500, that it was not contemporaneous with the work of Bishops Fox, Bird, Edington, or Wykeham.

As to some of the Flemish Renaissance of civil and domestic buildings, I think the typical New Zealander foreseen by Macaulay will not trouble to investigate it.

The moral of Mr. Bond's Paper seems to be, to take no authority for granted, to approach inquiry with open mind, and after thoroughly comparing documental and architectural evidence, and weighing discrepancies judicially, to deduce results modestly and without dogmatism, so that, as far as possible, the truth may be ascertained.

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† Swedish Architecture, vol. vii., TRANSACTIONS R.I.B.A.

METAL-WORK.*

By T. Swaffield Brown,
Master of the Art-crafts Guild, Sheffield.

THIS is rather a large subject to handle within the limits of a paper; but it is one which, in the present position of art affairs, needs careful attention, because we are, as it were, at the parting of the ways. One is being advertised by the dilettante contributor to the so-called "art" press, who as a rule knows very little about it; another by the archæologist and antiquarian, who wants us to go back to the early, or the middle, or the later centuries, whichever he happens to know most about; another by the manufacturer, who wants to lead us to where he can make most money, and perhaps dubs himself an "art designer and manufacturer" for plausibility; and yet another by the "art" crammer, with his red-taped track and his "authorised programme." And so on until the only thing we are certain about is that there is a moving, awaking spirit abroad amongst us, awaiting guidance, and that upon the wisdom of that guidance depends the future of English art work in metal, if not in all other materials; and if we remember that such work in the aggregate reflects the national life and character, and, separately, is the outward expression of its maker's inner self, we must see that the present condition of affairs leaves much to be desired. I have chosen to talk about metal-work on this occasion, not only because I know something about it, and that it is the principal concern of this city, but because architects are the people of all others to whom the great, ignorant public—or rather those who feel the need of guidance—look for that guidance.

And rightly so. Considering the relation of architecture to most of the other arts, its professors are, or ought to be (by reason also of their training in the knowledge of those principles and laws which are the foundation of all good and beautiful work, whether it be the building of a palace or the making of a candlestick—it is but a question of degree)—I say they are, or ought to be, the natural leaders of the public taste.

It is ignorance of principles which constitutes the most serious danger in the modern revival of "art metal-work," as it is called; and the only remedy that I can see is the creation of a more intimate relationship between the man of principles and the man of practice, as a means towards the better understanding of both by each.

If right principles govern the craftsman's thoughts and direct his special skill, we shall get good work (especially if the two qualities exist in high degree in the worker); and if to them be added that indefinable faculty called "sentiment" or "feeling," the sense of beauty, we shall get *beautiful* work; not otherwise.

The modern distinction between "art metal-work" and other, as generally used, is entirely illusory and mischievous. Illusory, because it is founded upon a misapprehension of the nature of art. Art is a spirit (according to the Bible, the spirit of God),† and not a trade quality. It may exist in the humblest and simplest work of the village blacksmith, in greater degree than in the silver candelabrum or the gold casket (as a matter of fact it often does): neither high elaboration nor unfamiliar form necessarily indicates its presence; nor its absence, absolutely. It is a question of degree, not of kind. You never speak of *pictures* and *art pictures*, but of good and bad pictures. It is mischievous because it tends to become real, separating art from common uses, and making it a "speciality" instead of cultivating it as an all-pervading influence.

As a matter of fact, "art" is being made a stalking-horse for the winning of money in this way. I need scarcely say to this audience that the use of art—of design—is not the making of money primarily, nor the illustration of ancient history, nor the display of literary skill, nor the winning of medals and certificates; but the exaltation of men's lives. I cannot go into the morals of the question here; but, truism as this is, it is often overlooked.

Metal-work includes a very wide range of material and purpose. To this latter belongs the distinction between ecclesiastical and domestic art. The only difference in the past was due to the requirements of its purpose. The material was the same, the workers the same, and the prevailing style was the same; but in past days men's religion was a part of their lives and influenced their work, and no doubt the work for the sanctuary, the visible symbol of their faith, was more lovingly elaborated than that for use in domestic life.

But I do not propose to go into historical retrospect more than by casual reference. It has been done in volumes by the historian and the archæologist, and you probably know all or more about it than I could tell you. The work of the past is incalculably valuable in its teaching, but unfortunately much of it has been neglected and lost sight of, and only its outward and visible results have been made use of as patterns for reproduction. But these were the expression of the thoughts and impulses of their makers, and what we want is the expression of the thoughts and impulses of our makers. It was done as well as their means enabled them to do it; we want ours done as well as our means will allow us to do it. Our material means are as ample as theirs at least, but are chiefly devoted to copying what they did, with all its accidents and crudities, instead of being applied to the realisation of its principles.

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* Read before the Sheffield Society of Architects, on November 8, 1898.

† Exodus xxxi. 3.

For it should be remembered, in connection with ancient work, that it was executed under conditions widely different from those under which we live. For long periods there was no settled feeling of security. The church and the home were—in different degrees—alike fortresses, fitted for the stress of warfare and the possibilities of defence rather than the enjoyment of such comfort, and even luxury, as have now become matters of course with us. And the character of their work reflected these conditions.

So that we should use our study of the past as a backsight to assist us forward, and only so, because otherwise, if we work back to it and merely copy it, we shall only produce anachronisms and incongruities. We shall stultify our skill, and record indisputably—and more or less accurately—to future generations, our utter sterility of imagination, if not our want of common sense.

I have made these remarks so that you shall not think that in what I have to say I am insensible to the beauties of old work: I am not, but keenly sensible to many which lie deeper than the surface; but I am the more concerned with the new, that which we have to live with (some of us by) in the present, and to be remembered by in the future.

It is curious to reflect that, through all the centuries and in these days of startling discovery, the metals used generally in the arts remain substantially those used in the remotest antiquity, *i.e.* iron, copper (and its compounds, bronze and brass), silver and gold, with lead, tin, and in some forms, zinc. Platinum, aluminium, and many others have been discovered, but their use, in this connection, is too limited to affect this generalisation. Nickel is an exception, but its discovery and use has done little but mischief in its common form (combined with brass as German silver)—I will mention presently how and why.

PRINCIPLES.

The principles which govern the choice of material and the degree of elaboration to which it should be subjected are simply and precisely those by which we regulate, or ought to regulate, all our other affairs, and may be summed up in a very few words: fitness for purpose, and sincerity.

For instance, iron is the strongest, hardest, lightest, and least costly of the metals used in this connection. Therefore it should be used wherever these qualities are of greatest importance; but it is practically black, and extremely liable to destruction by oxidation or rust, and it must be worked at a great heat. These are limitations demanding that its design be simple, exhibited in lines rather than broad masses; that its arrangement of foliation or other features should furnish as little lodgment for moisture as possible; and that it should be capable of being wrought rapidly.

In its cast form it is brittle, liable to fracture either by violence or other causes, such as extremes of temperature; its character can only be that of the material in which the original pattern is made, and that much marred: if these qualities indicate suitability for any purpose, to those purposes it should be confined.

Copper is tough though soft, beautiful in colour, heavier than iron and much more costly, extremely ductile and malleable while cold, hardening under the hammer. It cannot be cast, except by the addition of an alloy. With about 10 per cent. of tin it becomes bronze; with about 25 per cent. of zinc it becomes brass. In these three forms, however, we find very different qualities. As fine copper, its toughness—untearability—points to its utility in the form of plate for purposes which require considerable tensile strength and complex form, such as large vessels for holding liquid. Its malleability renders it a fit material for embossed work, especially in exposed positions, in which it is quickly protected by a brown patina which forms upon its surface.

As bronze it is much harder, more costly, very imperfectly malleable. Its great limpidity in a state of fusion, however, and its beautifully coloured patina, render it peculiarly suitable for some purposes, in which the hammer is out of the question—such as the casting of statues, bells, &c., to which uses it is practically now confined.

As brass it is less costly, and the most brilliant in colour of all the baser metals. Fairly malleable and ductile, strong, but liable to become rotten all through its substance if allowed to get corroded, and consequently needing to be kept bright, it is the metal to use where brightness of aspect is an object. It is capable of being embossed; but as its beauty is only or chiefly to be developed and preserved by polish, it is not suitable for delicate elaboration, but rather for breadth of undulatory surface, the design being worked out in brilliantly reflected light.

Silver and gold, heavy and costly—gold nearly twice as heavy and thirty times costlier than silver—are the precious metals, precious not only intrinsically, but because of their qualities; beautiful in colour, inodorous, tasteless, incorruptible, and susceptible of elaboration to the highest degree of refinement, are naturally the materials for precious purposes—for sacred vessels and symbols, for the higher domestic uses, for personal adornment, for insignia of rank or degree, for all intimate use and personal contact.

These being the principles of selection of material, the next principle, the great one of good craftsmanship, is "Sincerity."

Whatever the material and the work *is*, *that* it should appear to be. Whatever purpose it is to fulfil, its design should fit it for, and point to. Whatever the character of the material may be, its manipulation should develop and not destroy it.

Consciously or involuntarily actuated by these principles, and hammer in hand (not in the drop stamp), the smith will do good work whether he thinks he is doing art work or not; and without them he will *not* do good work, even if he thinks he is doing *art* work.

And now as to means. The chief, the archetype of smiths' tools, is the hammer. "By hammer and hand," the adage says, "all things doe stand;" and only by it, controlled and directed by heart and head (that is, by will and by skill), can his work stand.

The effect of a hammer stroke can be got by no other means. The hammer is a part of the man who wields it, and the instrument through which his imagination or feeling finds expression; every blow has a subtle bias, perhaps unconsciously given, which aids that expression; and as soon as you begin to substitute mechanical work for imaginative, you throw away the substance for the shadow, the living thing for the dead body; you discourage skill, and lower the value, the mental and moral status, of the worker. Handwork owes much of its charm to effects which spring spontaneously from various causes, physical and mental, perhaps in the quality of the metal or the condition of the temper of its worker, but which give individuality to every curve, or frond, or boss, which often lead to fresh developments hitherto uncontemplated; and so the work gains variety without departing from the general intention or impairing the utility of the object.

This touches the questions so often discussed, of machine-work *versus* hand-work, and "When does a tool become a machine?" Well, I think a tool becomes a machine as soon as it is taken from the hand of the living man, where its direction and force is subject to the slightest variation of his will, and made the instrument of involuntary and unsentient energy, in which position it may only be employed legitimately for the doing of labourers' work, the putting of material into convenient form for elaboration by hand, and thus saving the expenditure of much human energy without superseding human art.

In the actual working of the metals there is little difference of process, the greatest being that iron, speaking generally, must be wrought while hot, and all the others can only, or better, be wrought cold (although heat is necessary in some stages of the work). For this reason I shall deal chiefly with iron and silver, because silver processes are fairly representative of those of the other metals.

IRON.

Iron, as you all know, is, through its possession of the qualities I have mentioned, a metal of very wide and varied use. In its wrought form, its great strength and hardness fit it especially for the defence, security, and protection of more precious things; and for other purposes, involving power of resistance to force; and its stern aspect is in keeping with such duties. But for all that it may be made exceedingly comely under proper treatment, and the docility with which it submits to such leaves no excuse for its neglect.

You have been spending a large amount of money in wrought-iron work for tramway purposes, and what have you got for it? Wrought iron, yes, of a sort, but one pattern to every detail repeated every forty yards, I believe, to hundreds. (I suppose now, if you were to substitute for these, beautiful golden angels, with jewelled crowns on their heads, and hands outstretched holding the wires which, you think, are to be such blessings to the city, your admiration of the first would be turned into scorn or indifference very quickly by their palling uniformity of expression.) Well now, if these are wrought by hand, each might have its own character, or, at all events, you might have had a considerable variety—it is done in some places—without adding to the amount of work fixed by the proposed expenditure. Some would be better than others, some probably bad; but you have discords in music sometimes which are useful.

The process of working is simple. Forging, bending, and welding are the principal operations. Forging is the creation of the desired form by hammer-strokes out of the rough material; bending explains itself; and welding is the joining of separate parts by hammering them together at an intense heat. This method is peculiar to ironwork, and by succession or combination of these operations the whole work is done. Its results are most familiar to us in the form of screens, gates, door-hinges, &c. As its dark surface reflects but little light it is generally seen *en silhouette*, therefore its design should be clear in outline and its details very distinct. It is worked in fits of heat which rapidly subside, therefore its detail should not be dependent upon prolonged elaboration for its effect. Welding heat is apt to become destructive, "burning" the iron and impairing its strength, therefore welds should not be unnecessarily multiplied, especially between parts of unequal thickness. Ties and bolts often become pleasant features in the design, making decided little breaks without disturbing or obscuring the lines on which they occur.

Foliation is a difficult subject to deal with. In the form most generally used—that of an acanthus frond partly enveloping the stem upon which it grows—I think it entirely out of place. All foliation on this class of work should be in a vertical plane or approaching it, and kept as clear from the stems as possible, not only because otherwise it blurs the lines of the work, but because it becomes a fruitful source of mischief unless very carefully dealt with.

For instance, upright husks surrounding a central spike, unless kept open at the bottom, catch the rain and dew and store it at the root of the spike. A leaf clasping the lower curve of a volute, or in many other situations, does the same. In each case a little laboratory is set up, and commences operations at once for the conversion of good iron into rust, which for our purposes is destruction. Witness the new gates at Weston Park, and the new electric traction posts. The old gates of the same park, though much smaller and less pretentious, are good in design, and all these principles are in force in them, and it is perhaps hypercritical to suggest that they would have been better with more ties and fewer rivets; but at all events they are now in better condition than the new ones.*

All the greater curves should be designed to make contact with others or bars, and should be tied at that point as often as possible. Two curves of weak structure become strong by mutual support when so treated.

Of course these considerations do not apply with equal force to chancel screens, gates, and grilles, and such interior works, which are not subject to such destructive influences nor seen in the same light as out-of-door work; but the same principles and processes govern their construction.

Different conditions come into play, again, in such work as hinges and clamps for doors and chests. Here the iron-work is carried and kept in position by the wood, which it protects, strengthens, and adorns. (I do not forget that the hinge really carries the whole thing, but I am speaking of the ornamental development of the outer clamp.) The governing conditions are the gradual distribution of substance from the points of suspension, the necessary positions of the holding bolts, and the flatness of the surface, which it must closely fit.

For these and similar purposes the work should be hammer-finished, not only because the hammered surface is most durable, but because it is most expressive of the character of the material and the method by which it is worked. At the same time, in avoiding the seductions of mere smooth *finish*, as it is called, we must not allow ourselves to be deluded into the idea that rudeness is a virtue *per se*, and exaggerate it purposely, as is frequently done now.

But under other circumstances it may be quite necessary to give higher surface finish, as in locks, keys (and, in the past, body armour), which its great strength makes it the most fitting material for. Here its susceptibility to high elaboration is a useful quality. It may be chiselled, embossed, twisted, filed and ground, and damascened.

This mode of surface decoration is a very tedious and delicate one. The lines of the design are chiselled or graved very deeply; gold wire or plate is then laid in the grooves and hammered; this drives the gold in, and brings the edges of the groove partly over it and locks it in. This process is seldom practised now; but another and easier one is the etching of the *ground* away by acid, and burnishing very thin gold upon the raised lines while warm. This process makes work which is extremely liable to damage; the other cannot be injured by any means short of the destruction of the object decorated.

Silver and gold, although differing widely in weight and value—gold, as I have said, being nearly twice as heavy as, and thirty times more costly than, silver—I propose to deal with together, because their processes are the same, only differing in scale from each other and from those of other cold-worked metals. In their pure state they are extremely ductile and malleable, but they are seldom used in that state, on account of their softness. To remedy this, silver is alloyed with copper in the proportion of silver thirty-seven, copper three. In this state it is called sterling or standard silver, because it is the standard of silver values, and is always referred to where silver is spoken of, except in the rare instances of the use of fine or pure silver, which is always distinguished as "fine." These are the only two qualities recognised by assay masters, and are stamped or "Hall marked" with different symbols.

Gold is alloyed with silver or copper, or both, it may be in any proportion, but is only marked as 22, 18, 15, 12, and 9 carat by the assay masters. (Carat in this use is not a fixed weight, but merely the twenty-fourth part.) There are two standards: the first of twenty-two parts fine gold with two of alloy, which is the standard of gold coinage; and the second, eighteen parts fine with six of alloy, which is the standard of gold work generally, and is understood if quality is not specified.

The art of working these metals, as practised of old, and as it must be again if silver work is to remain "art" work, is now all but lost. *Improvements* of process—the electro-plating vat, the steam stamp, the spinning lathe—have, by the fatal facilities they offer for the evasion of skill and the production of imitations of its results,

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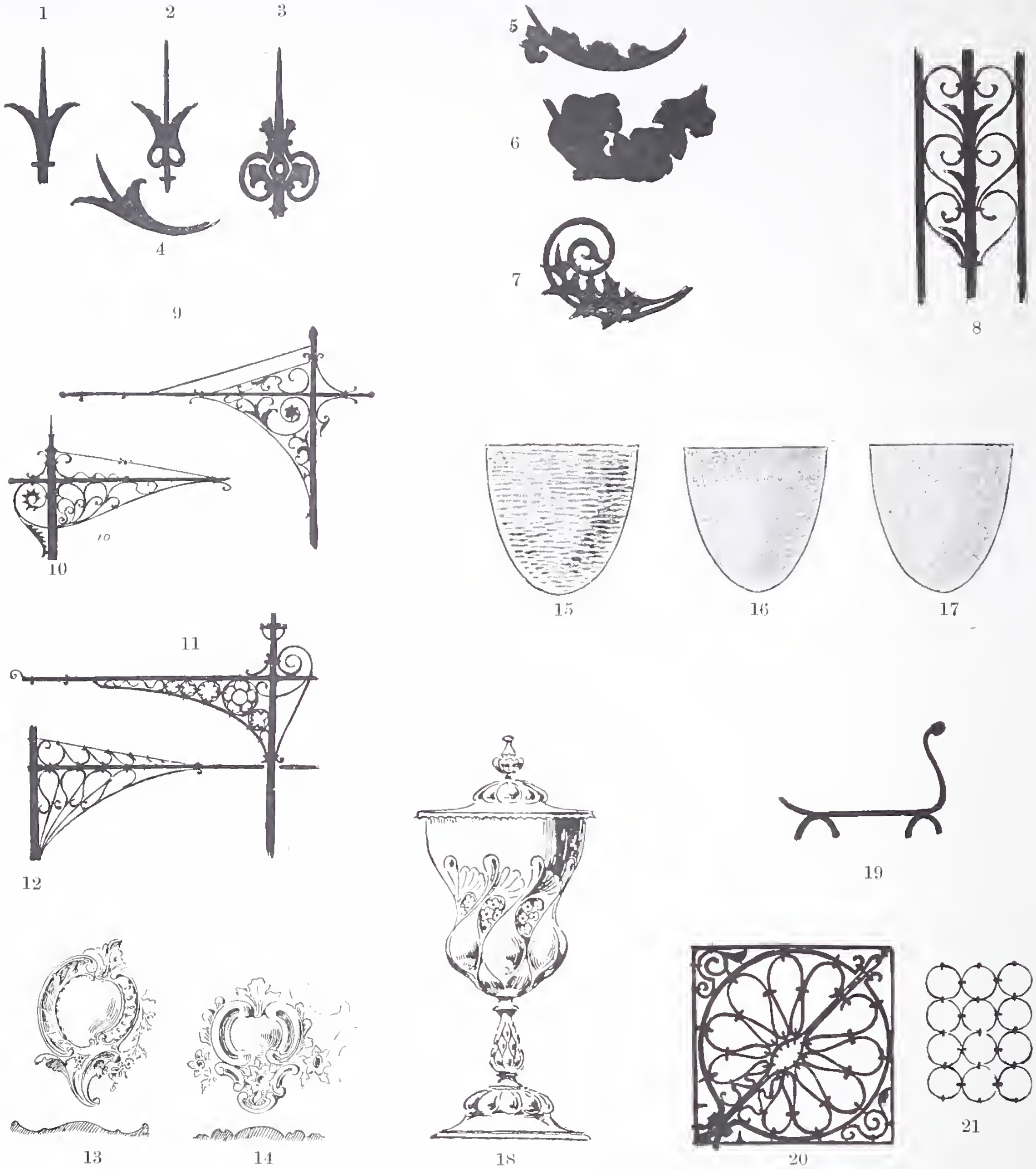
* The posts I referred to are not good in design. The ornamental work is flimsy in execution, and does not properly fulfil its ostensible purpose, that of supporting the span carrying the cables. Its futility is indicated by the tie rod introduced above it to do its work.—T. S. B.



Nos. 1, 4, 5, 8, 9 are examples of the "rust works"—No. 9 (a sketch of the tram traction poles now erected in Sheffield) being shown as an example of bad design, the thick tie-rod at the top pointing out the futility of the decorative spandrils; Nos. 2 and 3 are suggestions for the avoidance of rust ravages; No. 6 shows the effect of redundant foliage, and No. 7 that of properly treated (*i.e.* vertically arranged) foliage in silhouette; Nos. 10, 11, 12 illustrate the remarks as to variety; and Nos. 20 and 21 illustrate the remarks about the value of ties in design. No. 19 is a sketch of "dog" used in pairs to support wood, and therefore out of place in the modern "art" grate for burning coals. No. 15 shows the effect of the first or forming stage of hammering a silver cup or vase body, No. 16 the next stage, and No. 17 the random markings of the hammer used as decoration but not constructive. Nos. 13 and 14 are sketches showing how the peculiar curve of raised silver or copper lends itself to decoration as exemplified in the Louis XV. or Rococo style, and the wretched travesty of it produced in England in the early Georgian period, and copied now in tons of silver goods every year. No. 18 is a design intended to show the great malleability of silver and treatment it is susceptible of for display of brilliancy of surface when required.—T. S. B.

reduced the silversmith to a mechanic; and the character and qualities of the material, instead of being developed and manifested in the work, are really thrown away.

For instance, let us consider, as a type of silver work, the making of a drinking-cup (in ecclesiastical use, a chalice). It is the emblem of hospitality, from the time of Melchizedek, and of fellowship in the greatest society in the world, the Holy Catholic Church, and therefore claims precious material and the best work. The bowl and foot are each hammered out of a disc of metal (formerly as cast from the crucible, on a flat stone or anvil, but the need of the mere labour of the earlier stage of the work is now superseded by the rolling mill). After being roughly dished into the hollow of a wood block or sand-bag, it is hammered on the outside in circular courses, with a hammer adze-shaped but blunt, upon a round-surfaced iron, squeezing the metal upward and inward and distributing its substance gradually as it is needed, thick in the bottom and thin at the lip, or otherwise as the worker wills, until the form desired is attained—all is as regular as the deposits which build up a snail's shell or a crystal, and the same results follow, good line and contour. In this state it is marked all over with the evidences of its process, the impressions of the hammer, in the form of long shallow grooves, transverse to the axis of the bowl. These are removed and the form still further developed by a similar operation with a flat-faced hammer (called a planisher). This leaves the inner surface quite smooth, and the outer covered with faint hexagonal facets—again you observe that these are the evidences of process, and their regularity is the index of the worker's skill and the perfection of his work; but it is not intentional, it is merely the accident of the process, and is generally removed in finishing or by subsequent decoration. These two conditions of the work are the sources of origin of that class of work which has been much practised lately under the euphonious titles of "chip-hammered" and "bullet-hammered," neither of them possessing the character of the original, and only serving to disguise the want of invention of its designer. The whole work is entirely dependent upon the skill of the craftsman, and this simple object illustrates the whole art of the silversmith. But now—a disc of silver is banged into a steel die, with a ton of iron for hammer, or is wrapped round a revolving piece of wood by the pressure of steel tools, and its character is that of the steel die or the turned piece of wood. It is exactly like a multitude of others, all weak where they should be strong, and heavy where they should be light—all *wrong;* and those that make them become like unto them.

The following paragraph headed "The Production of Hollow-Ware," which appeared in a recent newspaper, expresses their view of the matter:—

> There have been several trials recently on the part of Sheffield manufacturers of silver and plate to introduce the system of employing sectional "chucks," or moulds, in the spinning of hollow-ware, as is done in America, but up to the present time they have not been attended with the success anticipated. This is owing chiefly to the very considerable expense attending on the providing of the moulds. The system hitherto pursued here is to work with wooden moulds, which are more or less imperfect in outline, thereby leaving the entire shaping of the article to be spun to the skill and taste of the workman; occupying much time, and involving the production of the article in considerable cost. The American mould is made of brass or steel, and is of the exact shape of the article to be spun, and the operation can be performed by a *practically unskilled* workman with rapidity and ease. The beauty of outline, of course, depends not on the workman, but on the perfection of the mould. The objection taken to the use of these moulds by Sheffield manufacturers is their first cost, which is much greater than the wooden mould. They state that there is not a sufficient number of a single-pattern article required to justify them in setting up these moulds; but there are practical men in the trade who believe that by using the American moulds goods can be turned out at a less cost, and a very much larger trade might be secured.

The introduction of the method of silver-plating copper, by casting compound ingots and rolling them into sheets, has produced very peculiar effects. It called for very skilful treatment by the smith, in order that the thin silver coating should not be damaged in the course of working, and so encouraged skilled work; but the necessity for stamping its decorative accessories, such as borders, in very thin silver, led to an enormous development of that process, and we got that curious mixture of good workmanship and bad art which we see in much "old Sheffield plate," and the growth of the "stamp" curse.

Then that compound of nickel and brass, which is known as German silver, brought into large use by the discovery of electro-plating, began to play its part in the destruction of the silversmith's art. Electro-plating did away with the necessity for careful treatment, and opened a splendid field for the practice of bad workmanship in this way. German silver is a very refractory metal; its malleability is very low, so that it cannot be worked like silver or by silver methods: therefore the rolled sheet is cut into the nearest possible development of the form required, turned up and brazed at the edges, so that our cup would appear as a truncated cone, to be battered by mallets into some resemblance to its silver prototype, and then to have a bottom put in. It would be disfigured by its seams of brass, and might be by tin solder, or by patches let in to repair bad places, but it was all covered up in the plating vat. The whole process made a smaller demand for skill upon its workers, and this led to its gradual adoption for silver work, and so the art of working silver with the hammer fell, in Sheffield at all events.

The principal form of decoration is "embossed," or, as it is now the fashion to call it, "*repoussé*," perhaps not exactly accurately. I think the word originally stood for work in which the desired effect is produced by beating the ground down or back, a method much used for enrichment without alteration of contour.

Embossing is the beating *up* of the ornament from the back by hammer, punch, or "snarling iron." In open vessels or detached plaques, or in any circumstances allowing access to the back, the first two means are used; in others, the latter. The "snarling iron" is a bar of iron or steel with one end turned up, and the other, and thicker, end down, for convenient fixing in block or vice. This, being inserted into the article to be decorated, is set in vibration by blows of a hammer upon its exposed part. The upturned end, in contact with the metal, raises it proportionately to the force of the blows given and the firmness of the hand-grasp by which it is held, and its direction controlled. There is no resisting medium in this case, and only a soft one in the two just mentioned; and the metal adjacent to the parts struck is pulled up with them into a parabolic curve, which adds much to the charm of the work and indicates its process. You lose this altogether in stamped work, because its character is that of laboriously *cut* intaglio, lacking the suavity of contour and the touch and burr (given by subsequent elaboration from the front). Some of our would-be guides now insist that embossed work should not be touched from the front; but I contend that it must be in most cases, for the full use of the qualities of the metal and the satisfaction of ordinary vision, always considering the character of the material and the purpose of the article. What would be consistent with iron or pewter or brass is not with silver or gold. What would not be visible twenty feet away, we should miss at two.

This subsequent elaboration I speak of—the finish of the work—is performed by hammer and punch, the article being filled with a composition of pitch and brickdust, or plaster, which opposes sufficient resistance to the tool to prevent distortion of form.

Engraving, although so much used, is not in itself a proper means of decoration unless its lines are filled with "niello," a black substance composed of silver, lead, and sulphur; one of the dormant arts.

When I have mentioned that all solid joints are made with a solder composed of the metal in use, made more fusible by the addition of alloy, and fused under a gas blast urged by compressed air, I have said all that need be said about the silversmith's art. It applies to the other metals with little difference (except in the case of bronze), and with the exception of that important adjunct—the process of casting.

This perhaps calls for more painstaking care than any of the others, and is generally in a very unsatisfactory condition, although in special instances well done. The ancient *cire perdu* process was performed, according to tradition and Benvenuto Cellini, by preparing a model in pounded brick and clay, with other ingredients which must have made it not a very pleasant material to work in, then covering it with wax and finishing the surface of the wax. Upon this was formed the mould, by covering it with a similar composition, applied at first in a semi-liquid form and gradually thickened to the requisite strength, certain pins being inserted through the wax into the core to keep it in position. This mass of material was dried, and exposed to sufficient heat to melt the wax out, leaving a space between core and mould into which the metal was run. The mould and core being removed, the work was complete. But if this was the process, the result of the slightest failure must have been disastrous, and it is now never attempted, although the afore-mentioned theorists are always talking about it. It, however, gives a fair idea of the principles of casting, and in a modified form is used to this day. These modifications are important, and are these: for all large work the model is made in clay, which is moulded and cast in plaster. This plaster reproduction is moulded by surrounding it with moist sand rammed hard (generally in many sections), and confined in an iron frame. The mould, being removed from the model, is put together and filled also with sand, so that a sand cast is produced, which is pared down to the required thickness of the metal; it is then replaced in the mould and kept in position by core pins. The metal is run into the space formed by the paring of the core, and, if successful, the clay model is reproduced in metal. In small work, such as used by silversmiths, the same process is used for special work, such as statuettes, &c., but, generally, the model being moulded in plaster, the mould is divided into a convenient number of parts, generally opposite halves, and a layer of clay being carefully placed in each part a plaster half-core is run in; upon this hardening or setting it is taken apart and wax run into the space formerly occupied by the clay, and this film of wax is the pattern upon which the silver caster operates, and reproduces in metal. Here it would often be advantageous to melt the wax out, instead of removing the mould to take it out; but commercial considerations and custom prevent the innovation.

There is still another method of reproducing models in metal, the "galvano-plastic," as it was originally called—electro-typing—in which the metal is deposited upon the surface of the mould, from its solution, by electric agency: it is electro-plating prolonged until a self-supporting thickness of metal is deposited. It is accurate to the most microscopic detail, and, of course, its character is, to that extent, that of the clay or wax in which the model was wrought, and not that of metal at all, neither is it strong or tough, but soft and short. Where the model is a piece of metal-work itself, it is deceptive in its likeness to the original. (I do not know whether it is possible for it to be more like it than itself, but I know in one instance that an original in *repoussé* was disqualified in a competition promoted by a London company—one of the old City companies—as "merely an electrotype.")

Having indicated the principles, and touched upon the processes of metal-work, I will add a few words about the revival I spoke of at the commencement. One of its evidences was visible in Sheffield a short time ago in a collection exhibited in the New Gallery, which did not attract the attention it deserved. Without saying that it was altogether admirable—it contained some very beautiful objects—it was full of suggestion, and showed an appreciation of the qualities and capacities of material, and a freedom of treatment, which were absolutely refreshing. But there were evidences of affectation (which is poison to good art), which point the danger I referred to of neglect of principles: such as the imitation of the crudity of old work; the covering of articles with irregular hammer marks, not as the result of the forming process (or, if so, the work was very badly done), but for their own sake as decoration; and similar tricks unworthy of the name of art, which must not be practised if that revival of the union of heart and head, hand and hammer, is to be realised and resume its power as the expression of the presence of art in our midst.

To which happy end I, as an earnest craftsman, ask you, the architects and art leaders of Sheffield, to give all the assistance of your influence for the honour of your city and the credit of your country.

THE ANCIENT MARBLE QUARRIES OF GREEK CIPOLLINO.

By W. Brindley, F.G.S.

After extensive search in Greece on the Island of Eubœa, continued for several years over a large extent of country containing numerous quarries of inferior material now not worth working, a series of old quarries with beds of superior quality have at last been found on the Western coast, a little north of Carystus. The mule road from Calcis to Carystus goes through the centre of the Island, passing through the villages of Stura and Kapsala, which lie in a valley. Between these villages and the sea on the western side, a range of mountains rises to an altitude of 2,000 feet, running steeply down to the sea. One mountain still goes by the ancient name Pyrgadi, referring to the fort or outlook-tower on the summit, which commands an uninterrupted view south of the entire Gulf of Petali, and west the mainland of Attica with the mountain-range of Pentelicus. Upon the sea face of this mountain are the ancient quarries extending from the summit to the base near the sea. The upper range of quarries is very extensive and of great interest; showing old methods of working; columns and architraves of immense size finished and partly worked lying in all directions. All these were wrought, engaged to the solid rock, and when roughly shaped were wedged off and finished; numerous examples of work in progress are still *in situ*. One quarry contains the old smithy, with a bevelled trough all furrowed and worn by the tempering of the tools; while another trough of large dimensions lies alongside, into which the tools were thrown to cool after being tempered. Another quarry of large extent contains a number of square-cut holes about 15 inches across, where the upright posts were inserted; these extend also down the old mountain-slide at intervals all the way, and were used by the aid of ropes for the lowering of extracted masses, some of which were 60 tons or more in weight. As the separate works were completed they were passed over a great paved platform, which is between the various quarries and the top of the slide, to the sea, for embarkation to Rome and elsewhere. This platform, no doubt, was that of the overseer, where the blocks were numbered and received the quarry and workmen's marks. On the upper part of the mountain-slide, where it crosses, a slight depression is made for some 70 feet, with transverse monoliths of split columns and architrave blocks, which were found faulty in working, and as all the Roman monolith columns had to carry weight, no doubt the overseer condemned them at the outset. In the Bay the old harbour-mole for loading is visible at low water, and a barge-load of sunken columns is alongside. The Pyrgadi quarries no doubt belonged to and were exclusively worked for the State, while the lower quarries near the sea, named Duka, would appear to have been those of a private individual, and worked for lesser objects, such as pedestals and decoration, the quality being exceptionally good. The light parts are of a bluish and avanturine translucency with ivory whites, the darker banded parts being all shades of green and lakey greys, curled and bent about in all directions, producing, when cut into slabs and opened out, the most charming decorative panels or dados for wall-surfaces.

Carystium or Eubœan marble, now called by the Italian name Cipollino, from its onion-like markings, was the first coloured marble used in Rome. Some of the earliest examples are the ten columns to the portico of the Temple of Antoninus and Faustina in the Forum of Rome, thirty-eight feet long. Eight columns of similar size now remain in the old quarries, evidently worked at the same time, but never used. The quality of this marble and its appreciation by the ancients is proved by the immense quantity used; in Rome alone the number of columns of it, some of which are of immense size, are more than one-third of the entire various coloured marble columns added together. The Romans always used monoliths of coloured marble for their columns, never drums.

Roughly speaking, probably eighty per cent. of the wall and pier marble incrustation of St. Mark's, Venice, is of this Eubœan Cipollino, the whole of which has been obtained by the sawing up lengthwise into slabs old columns opened out to produce continuous patterns, chevron or otherwise, as the veinings may happen to produce; this is readily proved by examining the open vertical joints which bevel inwards. The narrow outer slabs of the columns were afterwards used for strip linings of the semicircular alcoves; so nothing got wasted. These marbles have always been supposed by Mr. Ruskin and other writers to have been brought from demolished buildings of earlier date—and as regards capitals it may be correct; but when we consider that the Turks held and fortified Calcis and other places near the old quarries, and that the residents to this day are not Greeks but Albanians, it is next to certain that the Turks knew of the quarries, and as only pieces remain of columns of moveable size, while those of practically unmoveable dimensions are left intact, it seems more than probable that the bulk of the supply was unused wrought material of late Roman Byzantine date from the quarries.

The quarries are now being reworked, several shipments of beautiful quality having arrived in London. It is being used in a number of important works in London, and some large monolith columns are now being worked for the new Roman Catholic Cathedral of Westminster.

REVIEWS.

THE ARCHITECTURE OF FATHPUR SIKRI.

Portfolio of Indian Architectural Drawings. Part I. Prepared by Edmund W. Smith, Archæological Survey North-West Provinces and Oudh. Photographed by W. Griggs. London. Issued by the Government, 1897.

The first volume of *The Survey of Fathpur Sikri*, by Mr. E. W. Smith, was published in 1894, and a review of it by Dr. Burgess was given in this JOURNAL.*

The reason for the publication of this "Portfolio" of drawings is thus explained by Mr. Smith in a short preface to them: "The originals from which the accompanying photo-lithographs have been reproduced were prepared in the first instance, amongst others, to illustrate the Report of the Archæological Survey of India, entitled *The Moghul Architecture of Fathpur Sikri.* The size of the Archæological Survey Reports being only 13 by $9\frac{3}{4}$ inches, the illustrations were necessarily, in some instances, on too small a scale to be of much practical use to architects, engineers, art students, and others. They serve the purpose for which they were intended; but to increase their utility and to further spread a knowledge of one of the most interesting periods of Indian architecture, the Government of the North-West Provinces and Oudh decided to reproduce a selection of the drawings on a sufficiently large scale to make them of more use to the scientific building professions, artisans, &c."

This being a portfolio of drawings, with only two pages of notes, there is almost no literary matter to deal with in a review. Some reviews are made up mainly of extracts—and that may perhaps be a good plan to follow in this instance—so two of the plates are here reproduced in the character of "extracts," as the best means of giving some idea of the work.

For this purpose the Turkish Sultana's house and Birbal's house are reproduced from the originals. Of these Fergusson wrote that "they are small, but it is impossible to conceive anything so picturesque in outline, or any building carved and ornamented to such an extent, without the smallest approach to being overdone or in bad taste."† On the same page Fergusson gives a very beautiful illustration of one of the pillars with brackets from the Sultana's house. There is also a cast of the same pillar and brackets in the South Kensington Museum, coloured to represent the red sandstone, of which this house is wholly constructed; from it, without the trouble of going so far as Fathpur Sikri, some notion may be formed of the great beauty and delicacy of the carving. The whole house is covered with similar tracing both inside and outside.

Birbal's house was erected by the Rajah Birbal for his daughter, a Hindu lady, who became one of Akbar's wives. Akbar, the greatest of the Muhammadan Emperors, was no bigot, but took Hindus as well as followers of the Prophet into his service. Birbal was a Hindu and became Wuzeer, or Prime Minister; he was in many ways an able man, for he also fulfilled the functions of Poet Laureate. Akbar and he were great friends, and many amusing stories have been handed down about them. Attention might be here called to a feature in Birbal's house—that is, the small arched niches in the walls; this is still followed in native houses about Delhi, Agra, and most of the North-West Provinces. These niches are not only beautiful in themselves, but they are useful in many ways, and they might be adopted by our architects for domestic structures, and reproduced in harmony with our own

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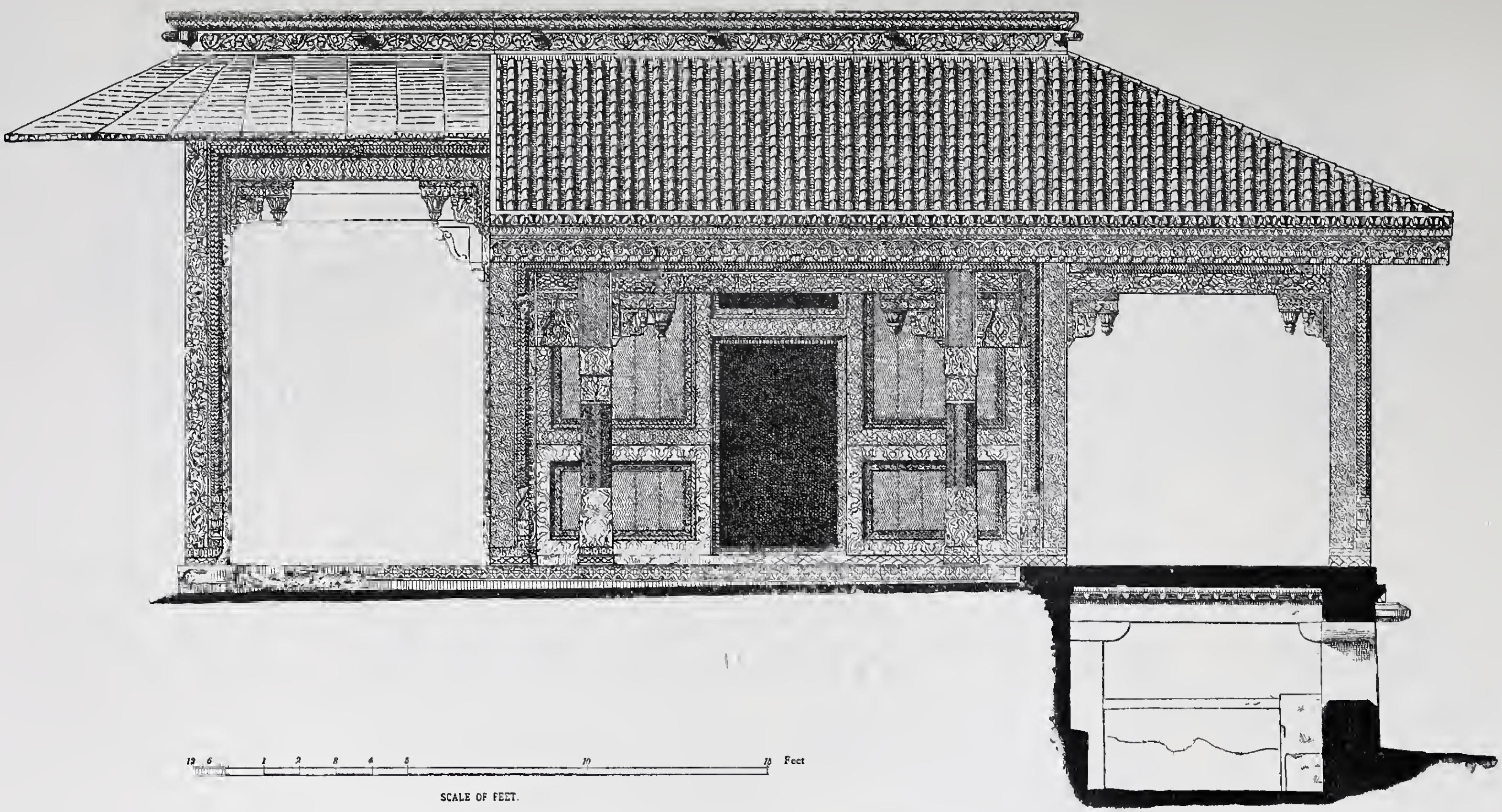
* See JOURNAL R.I.B.A., Nov. 25, 1895, p. 61.

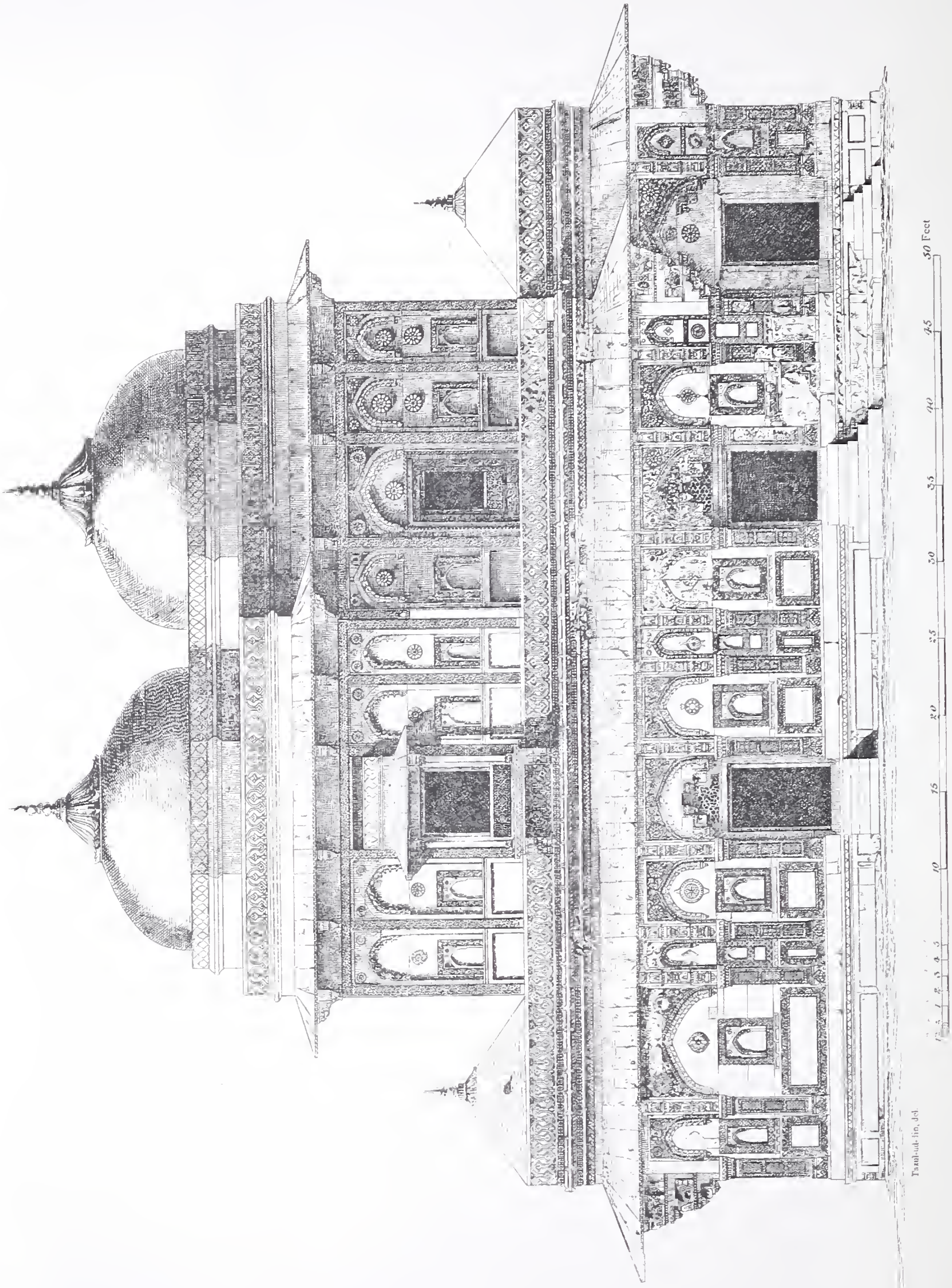
† *Indian and Eastern Architecture*, p. 579.



Section through covered way leading to Sultana's bath.

SOUTH FAÇADE, TURKISH SULTANA'S HOUSE, FATHPUR SIKRI.

Erected between 1565-1605. Built entirely of red sandstone, the roof being formed of solid slabs of stone, beautifully carved on the soffit.



Fazl-ud-din, del.

EAST FAÇADE, RAJAH BIRBAL'S HOUSE, FATHPUR SIKRI.

Erected 1571. Built entirely of red sandstone, except the outside of the domes and porch roofs, which are coated in cement.

styles, for they would admit of great variety in design.

It was in 1860 that I first visited Fathpur Sikri and made some sketches. I remember how delighted I was with the place; I had just come from Delhi, where I had been wandering about amongst the remains of the older cities of the same name; and where among the ruins I think there are some examples of earlier Muhammadan architecture that are superior to anything at Fathpur Sikri. Still, at Akbar's time, the latter half of the sixteenth century, that architecture could not be looked upon as having begun its period of decay; but it is visible in Jehangir's reign, and still more perceptible when we come down to Shah Jehan's time. After that there is no Muhammadan architecture in India that is worthy of notice; the bulbous dome had its commencement in Shah Jehan's reign; forms began to be exaggerated and flamboyant; the ornament grew florid and meaningless; and the downward career went on very similar to what we are all familiar with in the decadence of other styles. At Fathpur Sikri, Muhammadan architecture was free from the defects just mentioned; it was still a living style. Many of the features of Hindu architecture had been absorbed into it, particularly the bracket, a form that we might perhaps utilise at home here more than has yet been done, for its capabilities are numerous. There are other features that may be suggestive, and might be adapted with good effect into our own styles of working. It is to give architects a chance of doing this that Mr. Smith has made his selection of details for this portfolio. It contains fifty-two plates, which have all been very carefully and beautifully done in pen-and-ink, the work of native draughtsmen who have been taught in the schools of art which now exist in various parts of India. Some of the plates, I notice, have been done by my old Brahman friend, Bhairav Bakhsh, a pupil of the Jeypore School of Art. Some members of the Institute may remember when the originals of similar drawings, which were done for the *Jeypore Portfolios*, were exhibited by Colonel S. S. Jacob at one of our meetings; and how much they were admired on that occasion.

Wm. Simpson.

9, Conduit Street, London, W., 26*th November* 1898.

CHRONICLE.

Elections by Unanimous Recommendation of an Allied Society.

In accordance with the opening clause of the proviso to By-law 9, the following gentlemen, unanimously recommended for membership by the Council of the Glasgow Institute, and found to be eligible and qualified according to the Charter and By-laws, were duly elected Fellows of the Royal Institute at the Council Meeting of Monday the 21st inst.:—

John Hutchison, of 127, St. Vincent Street, Glasgow.

Alexander Cullen, F.R.S.Edin., of Clyde Street, Motherwell, N.B.

Birmingham Association Studentship Prize.

The Annual Report of the Birmingham A. A. states that the attendance of its students at the various classes gives evidence of increased interest, the meetings having been well attended and much good work done; but there has been little or no competition for the prizes offered in connection with them. The Council of the Birmingham A. A. have therefore determined to abolish the present system of numerous small prizes, and to offer a travelling studentship prize of fifteen guineas for the best set of measured drawings and a design for a subject to be selected by the Council. It is hoped this will be an inducement to students to sketch and measure in their spare time, and qualify for the valuable prizes offered every year by the Royal Institute.

Bristol Society Prizes.

In furtherance of their efforts to improve and encourage architectural education in their district, the Bristol Society of Architects offer for competition among their student-members prizes, value six, three, and two guineas, for the best sets of measured drawings of specified examples from English buildings, ancient or modern.

Liverpool Royal Institution—Award of Prizes.

The following prizes for "Architectural Composition" have been awarded by the Liverpool

Royal Institution:—First Prize of Fifty Guineas: to Messrs. Briggs & Wolstenholme, 3, Lord Street, Liverpool. Second Prize of Twenty Guineas: to Mr. R. W. Bedingfield [*A.*], 5, Hotel Street, Leicester.

Protection of Florentine Monuments.

The Institute has received from the Society for the Protection of Old Florence a memorial, which lies for signature in the Library and in the office, headed as follows:—

"In consequence of the complete destruction of some of the most interesting and beautiful portions of mediæval Florence, and of the threatened destruction of many more, a Society has been formed 'For the Protection of Old Florence,' among whose members we find Prince Corsini, Prince Strozzi, Count A. della Gherardesca, Count U. Serristori, Marchese F. Torrigiani, Count F. Guicciardini, Count Piero Capponi, Marchese Carlo Niccolini, Professor Villari, Signor Ulisse Cantagalli, the Librarian of the Laurentian Library and the Director of the Museum of the Bargello. Feeling how serious a danger is threatening one of the most beautiful of our historical cities, the undersigned English and American lovers of Florence desire to express their cordial sympathy with the endeavours of the Società per la Difesa di Firenza Antica."

The late John Gillett Livesay [*A.*].

The death of Mr. John G. Livesay [*A.*], which occurred at Ventnor on the 19th ult., was among the obituary announcements made by the Hon. Secretary at the opening General Meeting [p. 16]. Mr. Livesay was the eldest son of the late Augustus F. Livesay [*F.*], and had been an Associate of the Institute since 1882; but for twenty years before that date he had practised his profession at Ventnor. In 1864 he was appointed, by the Local Board, town surveyor, and on his resigning that office eleven years later, he took the position of consulting engineer to the Board. During his tenure of office he inaugurated and carried out an extensive sewage system, extended the sea-walls, and undertook several other important public works. In addition to this and to the general practice of his profession, Mr. Livesay was for twenty years manager of the Ventnor Gas and Water Works, of which Company he was a director. He was also surveyor to several large properties in the neighbourhood, among which are included the Steephill and Lowtherville estates, in which, during the term of his agency, great developments have been made.

University of California.

The following letter has been received from the Chairman of the Phœbe Hearst Trustees:—

Brussels, 30th October 1898.

Dear Sir,—The Jury for the International Competition for the Phœbe Hearst Architectural Plan for the University of California—composed of Messrs. J. L. Pascal, President, representing France; Paul Wallot, Vice-President, representing Germany; R. Norman Shaw, representing England; Walter Cook, representing the United States; J. B. Reinstein, representing the University of California—closed its sessions at Antwerp on the 4th October:—

The following is a list of the authors of the plans admitted to participate in the final competition:—

Messrs. Barbaud & E. Bauhain, Paris;
E. Bénard, Paris;
Prof. F. Bluntschli, Zurich;
Messrs. D. Despradelles & Stephen Codman, Boston;
R. Dick, Vienna;
J. H. Freedlander, New York;
G. Héraud & W. C. Eickmuller, Paris;
Howard & Cauldwell, New York;
Howells, Stokes & Hornbostel, New York;
Lord, Hewlett & Hull, New York;
Whitney Warren, New York.

The vote of the Jury upon each of the plans selected was absolutely unanimous; some of the Jury also recommended that four plans, besides those admitted to the final competition, should be purchased for the University of California.

The names of the authors of these plans are as follows:—

Messrs. Joanny Bernard & Robert, Paris;
Charles des Anges, Paris;
Ernest Flagg, New York;
Fred. Skjold Neckelmann, Stuttgart.

The members of the Jury, together with the architects invited to participate in the final competition, will go to California, and in June 1899 the Jury will there decide the final *Concours*, and select the plan, which must be approved by the Regents of the University of California, and thereupon the buildings will be erected with the utmost rapidity. It is expected that all the buildings will be completed within the next twenty-five years.

Yours truly,
J. B. Reinstein.

MINUTES. II.

At the Second General Meeting (Ordinary) of the Session, held Monday, 21st November 1898, at 8 p.m., Mr. H. L. Florence, *Vice-President*, in the chair, with 27 Fellows (including 10 members of the Council), 18 Associates (including 1 member of the Council), 1 Hon. Associate, and several visitors, the Minutes of the Meeting held 7th November 1898 [p. 16] were taken as read, and signed as correct.

The reader of the Paper referred to below, attending for the first time since his election as Hon. Associate, was formally admitted, and subsequently signed the Register.

A Paper by Mr. Francis Bond [*H.A.*], M.A., F.G.S., On the Comparative Value of Documentary and Architectural Evidence in establishing the Chronology of the English Cathedrals, having been read by the Author, and illustrated by a series of photographs shown by the lantern, a letter on the subject from the Bishop of London was read by the Chairman, and a discussion ensued: whereupon a vote of thanks to the author for his Paper and illustrations was carried by acclamation.

The proceedings then closed, and the Meeting separated at 10.15 p.m.

Onondaga County Savings Bank, Syracuse, N.Y. (R. W. Gibson, Architect.)

FIREPROOF CONSTRUCTION OF BUILDINGS IN THE UNITED STATES.

By R. W. Gibson (New York).

Read before the Royal Institute of British Architects, Monday, 5th December 1898.

FIREPROOF construction has been encouraged and developed in the United States more rapidly than in other countries; first, because of the vast amount of new work continually undertaken in the development of new cities, from which the evolution of improvements is natural; and, secondly, because of the growing danger and actual loss from gigantic conflagration which the dry continental climate has caused in cities constructed of combustible material. The long recognised superiority of brick walls of course induced their use to some extent even in the earliest Colonial days, and in places where at this time wooden construction prevails, because of its economical and hygienic desirability. The house or business building with brick walls and slate roof was valued, as compared with wooden buildings, chiefly for its fire-resisting qualities; but, with the growth of city buildings into crowded streets, and, upwards, many stories above them, it was soon recognised that this external casing of incombustible material gave in such a situation only a temporary respite, and that, before the heat of such fires as actually broke out, the combustible interior, with its wooden floors resting upon timber beams and divided by wooden partitions and doors, and stocked with combustible furniture and stores, made fires as hot and almost as dangerous and rapid as the original wooden buildings.

The ancient building methods of some southern peoples who preferred floors of masonwork, which, though usually resting upon wooden beams, completely encased them in brick and plaster materials, came into use to some extent in America in Colonial times, and their superiority in fire-resisting qualities was soon noticed and afforded a practical lesson. Portions of buildings were constructed in this manner, such as halls and corridors in hotels, and their greater safety was appreciated so much as to impel further development of the idea. The increase in height and size of buildings was at the same time compelling a more liberal use of iron, and, later, of steel, in their construction, and the first efforts at fireproof building were somewhat disappointing, because of a lack of perception of the difference between incombustible materials and fireproof materials. It was soon perceived that although iron is, under ordinary conditions, incombustible, it was very far from being proof against injury from fire of even moderate proportions; while, on the other hand, the small injury done to heavy timbering in the early stages of fire led to some excess of apology for its combustibility and efforts to continue its use. There were and still are many advocates of the use of timber in very massive scantlings who show with much truth that it takes longer to impair the strength of floors and pillars of this kind than it does those of unprotected iron. Yet very large conflagrations have proved that after all it is only a question of a limit to be passed when the massiveness of the timber becomes a horrible addition to the quantity of fuel. It may be safely asserted that the days of slow-burning wooden construction are numbered, so far as concerns large cities, although possibly rural factories, where economy of construction can be partly counterbalanced by an extra organisation of fire-extinguishing machinery, and where the destruction of one building does not necessarily imperil any others, may advantageously use these methods for a long time to come.

At the same time, the exposed iron systems, even when the combustible materials were reduced almost to nothing, have failed signally, because the heat generated by the burning of fittings and furniture and stored goods is sufficient in even the mildest cases to destroy the strength of iron.

The modern system of fireproofing has been developed from these experiences upon the still older patterns afforded in the old floors with beams buried in masonwork, the modern work using steel and iron instead of wood, and perfecting and systematising fireproof protection. Its latest and present phase is the final elimination of the last of the combustible materials tolerated now in fittings and finishings, such as doors, floors, architraves, &c. The principle insisted upon is vital, and is really the first one, viz. the absolute disuse of combustible material in the construction of the building and in its fitting and furnishing. The second principle, also now well recognised, is the selection from incombustible materials of those which are also fire-resisting, and the use of these to protect others which are not and which must not be used unless they can be so protected, because the use of the building will generally lead to the introduction of some combustibles into it as materials to be stored or as materials to be used in business or daily life, and these cannot be eliminated.

The materials most available for the fulfilment of these conditions at the present day are steel or iron, and brick or terra-cotta and plaster—the metal for the reception and transmission of chief strains, and the terra-cotta and plaster for the clothing and protection of the metal.

The manner of using the steel and iron may be regarded as a question of construction, since it must now be admitted that steel and iron have little or no power of fire-resistance. The true fireproofing lies in the use of a limited number of masonry materials, for it must not be overlooked that many non-combustible materials, even in masonry, are still as unreliable as the unprotected iron-work; some granites, for example, and marbles could be and have been wrought into strong and handsome staircases, with metal strings and beams and treads of stone, which are shattered and destroyed in the earliest blasts of a severe fire. It may be noted here that not only the intense heat, but a variation of heat, must be considered, and the destructive effect of torrents of cold water thrown upon substances raised to a white heat. Such a structure is non-combustible, but not fireproof, and it is a good example of what is meant in this distinction. Such materials may be used where their strength is not relied upon, as in wainscottings, or where they are protected: for example, if the staircase just referred to had all its iron encased in terra-cotta, and its stone steps protected by terra-cotta or plastered soffits, it could then be called a fireproof staircase.

In selecting materials for the fireproofing of others, regard must be had, not only to the destruction caused by fire, but also to injury likely to arise from the general use of the building, such as the blows and scrapes likely to be received by a column in a warehouse; and in this connection a curious but very important qualification, demanded in connection with high buildings and modern city life, is that the fireproofing must be such that, when the fire occurs, it will not be washed off by the terrific waterspouts turned upon it with modern engines. Some fireproofing, otherwise good, has failed altogether because the water from high pressure engines disintegrated it and tore it off.

Those most interested in fireproof buildings, such as underwriters and fire insurance companies, recognise fully the necessity of distinction between the several classes of fireproofing; and it is a fact that insurance rates are now adjusted according to the detailed construction of the building, instead of, as formerly, upon the broad claim that it was a fireproof building based simply upon the possession of an incombustible floor structure. The time has now come when a sufficient series of experiences has justified the holding of definite views in comparing various materials one with another. The sum of all these experiences indicates clearly the superiority of fire-resisting terra-cotta. It is one of the oldest materials used for this purpose, and has undergone many trials, and has always well performed the duty required of it, unless misapplied or imperfectly or unfairly used. The scientific valuation thus reached is confirmed by the practical tests of an open market; an overwhelming proportion, probably 95 per cent., of the fireproof floor work in use is of terra-cotta construction. It will be well, therefore, to describe in detail this generally accepted method. First, however, an explanatory description of the structural ironwork of the building is desirable. This may be divided into three classes, suited to as many types of fireproof buildings. First, the building which, being of ten stories or less, is erected by the old methods of supporting walls and superimposed columns carrying floors and roof, and with only small beams and girders or occasional independent trusses. Secondly, the building which, being of more than ten stories in height, accumulates such strains upon its walls that they must be reinforced by posts to carry the girder loads, and in which the walls require such mass in their lower parts to support their own upper parts that the metal first introduced to support the floor girders is reinforced and called upon to support the upper walls; becoming, in fact, a framing of vertical posts and horizontal girders, into which the wall is built in a series of panels of one, two, or three stories in height. This is so-called skeleton construction. When the height exceeds twelve stories, or when exposure to wind and other strains is great even at this height, the ordinary attachment of columns and girders is abandoned, and horizontal stability, no longer secured by the mass of masonry walls, is supplied by rigid riveting of all connections of posts one upon the other, and of girders to posts and beams to girders, and by the addition of bracing in ties and struts and gusset brackets; and thus is developed the final so-called cage construction, wherein the steel receives and transmits all loads to the foundations; and the walls have become mere panels, not only without vertical loads but without transverse bracing strains. Thirdly, an intermediate type of building has arisen where all the internal structure and all the floor loads are supported upon columns, some of which are placed in the outside walls, but the outside walls themselves are made of self-supporting thicknesses in cases where architectural treatment demands sufficient mass for this purpose, and where the foundation presents no difficulty.

This classification is, of course, structural. Any one of these three classes of buildings may be finished in different degrees of fireproof perfection; which will now be considered, commencing with a study of the highest class (of the third type) of construction, since it must be allowed that the massive walls are of value in resistance to fire as well as in affording stability. In a building of this class, erected for business purposes, perhaps in the form of offices for a large corporation, with many stories to be rented to tenants, there have been achieved to-day almost perfect fireproof qualities, although few of these buildings are so rigid in their exclusion of wood as to be ideal in this direction. Yet it can be asserted that there is at no time any danger to life from fire in such buildings, nor is there any danger, with reasonable promptness, of the fire spreading from the room from which it first occurs, even though that room may be full of combustible office furniture, and may develop heat to an extreme degree. This type of building has become systematised by custom and experience, so that its structure is similar and uniform throughout the country; and this not because of building laws or other regulations, but in spite of them, since these vary greatly in different localities, and have usually been amended in fragmentary fashion to meet and treat with the new methods of design forced upon them. In New York City this is notably the case; an old building law, framed before building steel was invented, has had a few sections interpolated to regulate fireproof building; and again, at a later day, a few sections more to regulate skeleton and cage construction: the imperfection of the result is such that the new charter for the greater city recently incorporated contemplates the appointment of a commission for the complete reconstruction of the building laws. We may therefore dismiss all reference to fireproof construction in municipal laws as being of little value in the present discussion, because these laws follow, instead of leading, the practice of the best architects and engineers of the day. Some of the more recently amended laws may be quoted as codifications of opinion to their date, and as such may be of some value in presenting facts in tabulated form. Referring, then, to the national practice rather than to any laws, this type may be best described by quoting the specifications which have been used for the erection of an actual building.* It will be seen that all the fireproofing is effected with terra-cotta, the exception being some portions of ceiling work and girder covering. The floor loads are supported upon columns of rectangular shapes of rolled steel, the outer columns being set in the outer walls in grooves, close-fitting but without bond, so as to permit of unequal movements and settlements and contraction. The girders are of rolled steel, built and riveted for large sizes, and of I-beams for smaller sizes (24 inches and under), and are all riveted to the side columns, so that these may be continued right through the height of the building in practically one length. The bracing is done with gusset plates and angles. The beams supporting the floors are small rolled steel I-beams, laid out to what has become a standard distance apart—viz. 4½ feet—and of what has become a standard of economy in size—viz. 8 or 9 inches.

This size and spacing arise from the use of the terra-cotta arch, of from 8 inches to 10 inches in thickness, which is, theoretically, good for ordinary office building loads up to a span of 5½ or 6 feet, and practically and thoroughly good and reliable up to spans of 5 feet, with sufficient factor of safety to permit of such cutting as may afterwards be necessary for the insertion of pipes, wires, &c. Many experimental tests have been made with these floor arches, with greatly varying results. They have been built with spans 7 or 8 feet, and have endured tests at these spans for very great loads ; but the difficulty of securing in a building the perfect workmanship used in a test makes all such records of small value as compared with custom arising from an accumulation of experience, and such custom has decided that $4\frac{1}{2}$ to 5 feet is the span of flat floor arch combining the necessary strength with desirable economy of construction under working conditions. As thus used, these arches are very economical, very adaptable, and elastic in their application, and requiring only a moderate degree of skill on the part of the workmen. They are made of hollow terra-cotta blocks, with joints inclined at a fixed angle, which is only a rough approximation to the theoretical radiation of such joints in a flat arch ; but there is no practical difference in the strength, and there is a great gain in having three patterns in all the blocks—viz. the springer, which rests on the flanges of the floor beam, the intermediate blocks, which are all cut to the same inclination, and the key-block, which, of course, has the sloped joint on both sides. The springer is made so that the lower surface forming the soffit or ceiling stands about $1\frac{1}{2}$ inch below the lower flange of the iron, and covers one-half of that soffit. The work is set upon a centering consisting of simple scaffold-boards hung $1\frac{1}{2}$ inch below the soffits of the iron beams; upon this centering the arch blocks are laid, and there jointed and flushed in cement. As soon as the work is set the centering is removed to a new panel, so the work goes on continually. It is customary to set the arches forming the floors as soon as the iron is ready for them, without regard to the condition of the walls or the absence of any roofing. In a building being hastened the iron-work will usually be seven or eight stories high before the walls are commenced, and the floors will be within two or three stories of the top at any time. Upon these arches a layer of cinder concrete is deposited, and upon this the finished floor, consisting of paving or tiling, or a composition of a concrete nature, or sleepers and wooden floor. A variety of floor arches of late date is the "end construction" arch, in which the perforations of the terra-cotta are arranged in the direction of the stress in the arch instead of at right angles to it, so that a larger quantity of material is used under strain ; but it is doubtful whether this is of much real advantage—it is rather the product of severe testing than of any practical need.

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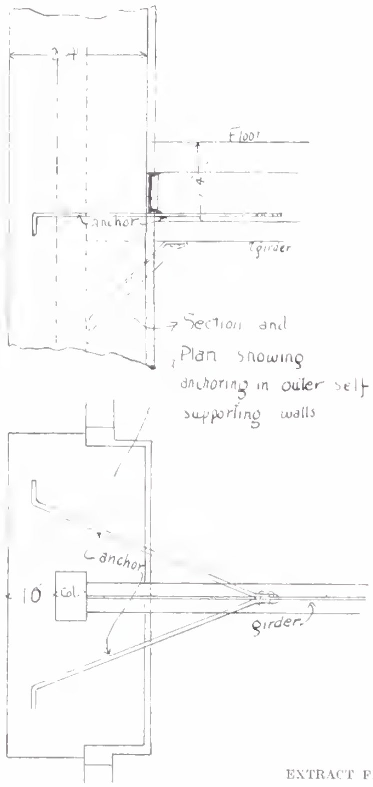
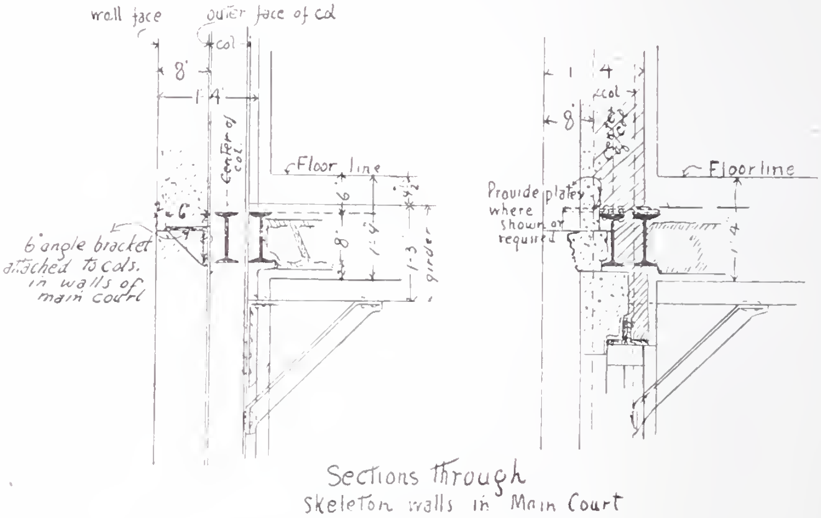
* The original specifications of the Onondaga County Savings Bank, Syracuse, N.Y., designed by the author of the Paper, were exhibited in the Meeting-room.

As the floor arch determined the distance apart of the floor beams, so it next regulated the distance apart of the girders. The span of the arch is indicated by its own working strength, and the depth of the beam is indicated by the thickness of the arch, because any considerable difference would have to be made up by concrete filling upon the top of the arch, which would be more expensive than the arch material itself. Then the depth of the beam having been determined within reasonable limits, its economical span is easily ascertained. This proves to be somewhere between 14 and 18 feet, which is the working distance between the main girders, and which, being a convenient size for a single office, is also taken as the unit of room width and the space allotted in the outer walls to a pair of windows. The distances will of course vary according to the floor loads adapted for different purposes ; those mentioned apply to buildings having floors weighing from 75 lbs. to 95 lbs. dead load per foot, and supporting live loads from 75 lbs. to 150 lbs., which are the usual limits for offices.

As soon as the rough steel frame is completed and the floor arches are all in, the outer walls are usually half way up, and the roof can be given its final covering. It is constructed with arches, the same as the floors, except that sometimes the steel beams are laid to the necessary pitch of about half an inch to the foot, so as to avoid the weight and expense of filling, which would be necessitated by level beams and arches. Sometimes an intermediate floor is temporarily converted into a roof so that the stories below it can be enclosed and warmed and finished. The walls need not be described in detail here, as they present no novelty in a building of the class under discussion. In general practice their thickness is made about two-thirds of the full thickness required for walls supporting the floor loads, and they are secured to the metal framework so as to receive its assistance in resisting horizontal wind pressure; but, as before mentioned, they are built around the columns in such way as to permit of their unequal settlement. The walls containing many windows are not usually considered as walls, but rather as a series of piers and panels, whose thicknesses will be regulated by their self-supporting strength, and by requirements of architectural appearance. As examples of thickness the following may be mentioned: a wall 150 feet high, divided into ten or twelve stories, would have thicknesses of 16 inches, 20 inches, 24 inches, and 28 inches, in about four equal sections of its height for massive buildings; while for skeleton frame buildings with walls supporting only their own weight the thicknesses might be 12 inches, 16 inches, and 20 inches, in three divisions; and for cage construction, with every story of walls supported separately on the frame, 12 inches throughout would be good practice. The New York law stipulates, for skeleton or cage construction, that the walls shall not be less than 12 inches for the uppermost 50 feet, 16 inches for the next 50 feet of height, and so on downward, adding 4 inches to each successive 50 feet, this being required in a law influenced strongly by the fire department for the sake of the stability of the masonwork itself. It is doubtful, however, whether it is worth while to urge greater thickness of wall below than above in a structure of pure cage skeleton type, unless exposed on one side to heavy fire risk from a combustible building, against which a well-built hollow wall with considerable mass of material is no doubt the best safeguard; yet, even here, 16 inches of brickwork, in two thicknesses of 8 inches each, would be relied upon to withstand any fire with the assistance likely to be rendered. The thickness of material necessary to resist the weather is found to be 12 inches at least of brickwork with terra-cotta interior furring.


2' 4"
Floor
4"
anchor
girder
Section and Plan showing anchoring in outer self supporting walls
anchor
10
Col.
girder


wall face
outer face of col
col
8"
1' 4"
center of col
Floor line
6"
6"
8"
1' 4"
4½"
1' 3"
girder
6" angle bracket attached to cols. in walls of main court
1
4
col
8
Floor line
Provide plates where shown or required
4
Sections through Skeleton walls in Main Court

EXTRACT FROM WORKING DRAWINGS FOR ONONDAGA BANK, SYRACUSE, N.Y.

Furrings are used in all American buildings, even of the cheapest class, to afford a dry and warm base for the finishing plaster-work; in cheap buildings they are light strips of pine, 2 × 1, nailed to the brick wall which receives the lathing, just as the quarters or studs of a partition. In fireproof buildings the furrings are hollow terra-cotta slabs or tiles 2 inches thick, and 16 inches by 8 inches, or other convenient sizes, built up against the inside face of the wall and secured with iron where necessary; sometimes, to save space, furring blocks of hollow terra-cotta are made the customary size of bricks, and the innermost four inches of the wall is built of these bonded with the brickwork, and this is permitted in the New York building law; but the protection against driving rain and condensation internally in damp weather is not so good. The efficiency of the wall as a clothing to the metal has been variously estimated, some authorities requiring that at least eight inches of brickwork or similar material should cover all iron to protect it from moisture and fire. The New York law permits a minimum of four inches, and there is no proof that it is insufficient, if reasonable care is exercised to prevent a concentration of moisture or heat at such a spot. It should be observed, however, that in the United States it is customary for every building to possess its own side walls independently of its neighbour, so that where important buildings actually join there are usually two walls to resist the transmission of fire; party walls are rare.

Assuming, therefore, that all the steel-work has been externally covered with masonry, affording from four to eight inches protection, the interior of the steel frame is protected in another fashion; this is, briefly, the extension over all of its exposed surfaces of the two inches of terra-cotta furring before mentioned. In some places a greater thickness than two inches is used, and urged, and where risk of great heat occurs it is undoubtedly wise; but a minimum of two inches of hollow tile with one inch of plaster has been demonstrated to be thoroughly effective, if well secured, in any fire likely to occur in residence or office building structures; three inches for ordinary, and four inches for dangerous storage may be considered good. First, all the iron posts and columns are covered, those next the walls usually to form square pilasters by the use of rectangular two-inch slabs, and the columns standing clear by means of segmental blocks with flat backs and with circular fronts fitted to the columns so as to give a circular finish over the square steel-work. It may be noted here that most of the steel column work is formed of sections which give an approximately square column, and occasionally the column finish of terra-cotta is also square, but not often. The preference shown for square column sections is undoubtedly based on the facilities for splicing superimposed lengths, and for attaching the angles and brackets required to support the girders and beams, and on the possibility of bringing the girder load upon the column near to its axis so as to avoid undue eccentricity of load. For moderate loads the Z-bar column is a great favourite for these reasons. Supporting eight or ten stories, however, the box riveted with plates and angles offers equal or greater advantages, while for the lightest loads a latticed channel column is most economical and adaptable; all of these are square columns. The round columns, such as the Phœnix segmental and certain octagonal and polygonal columns, while theoretically perfect as columns are difficult to assemble, and afford only imperfect facilities for attaching girder brackets, struts, &c.

The girders are protected by slabs of terra-cotta, as before described, secured with hooks and bars and wiring, and are usually given their outer form by means of metal lath upon light iron bracketing to receive the finished plastering, thus permitting uniformity of appearance in the ceiling design, while the girders within are of sizes varying according to their span and load. The soffits of the common joists or floor beams are protected, as has been before remarked, by the lower surface of the floor arches extending beneath them. All the steel-work thus covered is plastered; the rough coat being utilised to correct the form, and the final coats being frequently one of the exceedingly hard patent plasters which have become popular of late years. The lower portions of walls and columns are frequently finished with marble slabs, one inch thick, or with tiling, which is certainly an additional protection against the disintegrating effect of the water, even when not of much value against fire. In work where economy is urgent, and a lower standard may be tolerated, all the iron is protected by a covering of metal lathing, and a heavy coat of cement scratched and finished with ordinary plastering; but this is liable, as has been seen, to be damaged by water, and is insufficient in its actual mass.

There is a good deal of difference of opinion with regard to air spaces within the fireproofing, and great value is clearly proved for air spaces such as those afforded by hollow terra-cotta, which may be described as numerous and discontinuous, that is, affording no regular and extended communications: but it is clear that large and connected air spaces may, and probably will, act as flues when broken into, and actually draw flame and heat into places where it is most harmful. For this reason those methods are preferable which place the fireproofing material close to the metal and preserve numerous and frequently broken air spaces in their own substances, rather than those which, standing away some distance from the metal, leave it liable to attack inside of the protection. Bearing this in mind, a greatly improved cheap column protection can be made by using one coat of metal lath and cement in contact with the column, and a second coat furred out from the first upon metal lath upon light iron bars so as to preserve an air space between the two thicknesses of cement. This protection is finished with hard plaster which would stand the action of the fire-hose, and should be almost as good as the terra-cotta and considerably cheaper. These two systems may be fairly claimed to represent the best practice in covering iron, and in the event of unusual fire-resisting power being required it is evident that it can be obtained simply by adding to the thickness of the terra-cotta covering or to the number of coverings.

The greatest need of improvements in fireproof work is the bringing up of the lower grades to the level of the higher by a system of insurance inspection, or something of the kind, which will present in tangible form, to a certain class of owners, the value of good work which they do not themselves understand. There is a tendency in all building, and at all times, to put inferior work in places where it is soon covered up, and in fire resistance we have been working on so small a margin that there is little chance of doing this without injury.

After the structural steel is all protected the partitions are built; these are of various patterns, the best being undoubtedly the terra-cotta blocks, four inches thick for average heights, three inches for moderate heights, and six inches for great heights of story. They are occasionally stiffened with angle iron framing, when so cut or thinned as to be weak, but they show an extraordinary strength when well set, as they usually are, in Portland cement. Minor partitions, subdividing large rooms and sometimes all the partitions except those next corridors, are frequently built by using light angle iron posts or quarters covered with metal lath, and plastered either like the old-fashioned wood plastered partitions, or sometimes with very thin posts and one sheet of metal lathing only, so as to make a solid plastered partition about two and a half inches thick, which seems to work very well, although a three-inch tile partition will dry quicker and cost only a little more. Either of them will resist the passage of fire from one room to the next under ordinary circumstances.

When a building reaches the stage here described, that is to say, when it is ready for the joiner's work, it is probably more fireproof than at any other time. It has practically nothing combustible in its construction. The tendency to-day is to reduce more and more the amount of woodwork admitted after this stage in finishing, and to substitute fire-resisting materials, in places where it has hitherto been thought impossible; not only doors and sashes, but even glazing and office furniture can now be obtained of fire-resisting character, and their use is of very great value. A building of first-class fireproof construction, such as is found in New York, ten years old, to-day, can, and occasionally does, become the scene of a very violent conflagration. Several such have occurred, and although with the aid of the fire department they have been subdued before spreading beyond the rooms where they started, yet the amount and character of the damage done sufficed to point out the need of much greater strictness in selecting building materials. Consider the quantity of fuel present in an active lawyer's office in two or three rooms; there will be six or eight desks, two or three hundred feet of book and document shelving, beside chairs and tables and other customary furniture. As usually built, the roll-top desk is a perfect fire-trap laid for ignition, and often the waste-paper basket is placed beneath it and filled with paper ready for the match which is dropped in by some careless smoker. Several fires have originated in just this way. When once started it is soon discovered that the amount of fuel present makes a fire which exceeds the control of the tenants and janitors. Possibly there is a wooden panel partition dividing one of these offices from the next; in any case there are almost surely wooden doors with wooden architraves and jambs, and with glass panels, and, if the building is not of very recent date, possibly some wooden wainscotting and window panelling. The wooden floor may be pardoned, because it is rarely that fire reaches it; the natural draught upward in the supply of cool air from the bottom seems to protect the floor for a long time, and then when the water is poured into the room the floor is naturally again most protected. But all the other woodwork above mentioned should be banished in a building claiming to be fireproof.

The doors and architraves should be of sheet metal, wood cores must still be tolerated; such are already upon the market, and have been used long enough to demonstrate their practicability. The window architraves and jambs should be of hard plaster, and the window frames and sashes of chemically treated fireproof wood or of metal. The borrowed lights in the internal partitions generally used to light the interior corridors should have similar sash and trim, and these and the doors should have wired glass, which is also a demonstrated success in its ability to hold together and check draughts of hot air and flame, before which ordinary glass disappears. The outside glass windows must probably be tolerated in large panes of plate and sheet glass, because the value of the light and view doubtless exceeds the price paid for it in extra risk. As to the furniture, a really first-class office pretending to be fireproof, such as that of a large bank or public department, can and should have metallic book shelving, and desks, and cabinets, letter files, &c., all non-combustible, even though they scarcely claim to be fireproof in the same way that a safe is so made. It is of great importance that such things do not add to the fuel in the critical moment when the fire is commencing. The desks and tables may have wooden tops upon metallic frames and pedestals—in other words, the wood may be reduced to such a minimum quantity that the risk is almost nothing. Of course there remain the papers, books, implements, &c.; but this risk can be taken care of by the fire-hose of the building.

Every first-class building should have, and in New York does have, a number of private fire-hoses so distributed that every part of the building can be reached by one of them. They are of small diameter—about two inches—and are supplied by a large tank on the roof, and frequently by an auxiliary pump in the machinery department in the basement, in case continued use is required. As it has sometimes happened that the water has failed by reason of the main being found shut off when wanted, it is undoubtedly best that the fire main should also be the chief distributing main of the building; its extra size will be no harm, but the water will be always there ready for use. Such an apparatus has nipped in the bud many an incipient fire, and with this, and the care above mentioned as to materials, a building may really claim to be fireproof. A few buildings come almost up to this standard of protection. The use of the fireproof doors and architraves and wired glass is yet rare, but in all other respects a high standard has been reached. One may walk into a new banking room and find it difficult to discern any combustible material in sight, except the desk tops and the window sashes; even the floors are very frequently of mosaic or some ornamental cement composition or marble, although, as before remarked, the wood floor is the smallest risk. Even in ordinary fireproof buildings, where offices or apartments are rented, the halls, stairs, and corridors, and elevator shafts are entirely incombustible. Something remains to be desired in the protection of the staircases from flame at their soffits, because they are usually built of iron strings or carriages with marble treads all visible beneath, and, as will be shown later, fire may be carried to them from very distant points; still, the complete banishment of wood from these departments is of value. But it is true that the ordinary so-called fireproof building still retains too much wood; what is most needed is the bringing up of this class to the higher standard; the expense is not very great, and would no doubt be covered by saving in insurance and risk.

It is interesting to note from actual observation, first, how a fire starts in such a building, and, secondly, how it spreads. There seem to be three principal sources of fire: one is the engine-room and rubbish heap (if such be permitted) in the cellar, including, perhaps, that part of the electric wiring which is somewhat chaotic at the foot of the shaft. Next, the waste-paper basket, with the cigar-ash or match thrown in; and, next, ignition from an adjoining or opposite building already on fire. The fire originating in the basement is perhaps the greatest danger, but it is usually soon detected, as men are on duty here at all times. It is frequently found fostered by an oil store, where lamps and oil-cans are abundant. Such a thing should never be permitted at the foot of a stair or elevator shaft, nor should any large quantity of such combustible be admitted. The basement end of all elevator shafts and staircases should be completely closed off by tight iron doors, not latticed, but as nearly as possible air-tight doors and screens, which will serve to prevent fire draughts, and also to cut off engine-room smells from the upper parts of the building. This is done in the best buildings, and should be done in all. Its need is recognised in the building law of New York, which compels such treatment in apartment houses, and further orders that the floor over the cellar shall be fireproof even in apartment buildings of non-fireproof character in other stories.

The waste-paper basket and desk origin of fires is wonderfully rapid. Such a fire will make an office absolutely untenable within ten minutes from its commencement. Inasmuch as incombustible furniture can hardly be brought into general use at once, the most practicable present defence against such a fire is the fire-hose in the building, always at the disposal of tenants or any person willing to use it. With such fireproof construction as has been before described as perfect, such a fire can be safely left to burn out its own room if the door is closed and help is not forthcoming: this, in fact, has occurred in some cases in New York.

The next mentioned source of danger—fire from an opposite building—is very difficult to meet. When an intensely hot fire occurs in a narrow street, the glass windows opposite will begin to crack, and the window-frames and sashes to smoke; constant attention by firemen may for a time prevent and extinguish the little fires thus started, but they frequently break out at a dozen places at once, where window-frames and sashes and inside jamb panelling afford the most advantageous conditions of combustible material and fanning draughts of air, and then the fire is within the second building. This process is true of fireproof buildings as well as non-fireproof, for not more than half a dozen in New York City have incombustible sash frames and sashes. Something is done by setting the sash frame so far in the offset of masonwork that the latter completely covers it, leaving only exposed the outer bead, and even then the sash is dangerous and demands improvement. From adjacent buildings heat communicated through the walls attacks wainscottings, base boards, skirtings, and the like, and none of them are tolerated in the best fireproof work unless made of stone or metal. The skirtings are frequently of marble or slate; wainscottings and dadoes of tile or marble.

The manner in which fire spreads in a building has been very imperfectly described, probably very little understood, except by firemen, until these recent efforts to withstand it. It is easy to see how flame is communicated from one combustible mass to another, how it burns along a handrail or up a wooden elevator guide, or through a door admitting flame from one room to the next; but the passage of fire from one portion of a building to a remote part, apparently skipping intervening places, has been considered mysterious and unexplainable, yet is really very simple. A hot fire in a single room will generate a great amount of combustible smoke which consists largely of gas; this rises by reason of its heat, and escaping through fanlights and transoms, or open doors or windows into adjoining corridors, will travel, because of the wind draught, through the building a very considerable distance without being much diluted, and occasionally it will preserve such proportions of gas and air that a leaping flame in the original fire will ignite all the smoke practically at once in a kind of a low-power explosion. This may be on a very large scale in a very large building; a whole floor of a warehouse, for example, will become a mass of flame in an instant from a little fire in one corner, or it may be only a small volume of gas that is ignited in a long corridor of an office building; but, in either case, the fire, originally upon one side, may, after such an explosion, appear in many other places remote from the first. This is one of the risks which, in fireproof building, should be guarded against by the use of fireproof doors and wired glass, and it is to meet this danger that it is becoming recognised that corridors and landings and stairs should not be of single unprotected construction, but should have some guard against flame, even though it be admitted that the full fireproof flooring is not necessary.

An important effect of heat upon unprotected metal and, to a smaller extent, upon that which is protected, is the expansion, which may amount to a destructive quantity. Usually the protection herein recommended is sufficient to limit expansion to the extent necessary for riveted construction; but where ironwork, whether weight-carrying girders and trusses or merely external facings, is built upon and within masonwork walls and piers, and is unprotected from heat, it has sometimes pushed the masonwork out of plumb and thrown down portions before it actually failed of itself. It would, no doubt, be a good rule that all iron framing upon the fronts of buildings, such as bay windows and large mullions, should be protected with terra-cotta to the same extent customary in the interior.

A second chapter of this essay might well be devoted to dimensions and specifications of customary fireproof building; but it is thought best to supply these in an actual example. For this purpose a set of working drawings and specifications and strain and load diagrams of a first-class bank and office building designed by the writer, and recently erected in Syracuse, New York, have been selected as affording a good example of what is actually done.* Some interesting photographs show the building in course of erection in various stages [pp. 60–61]. The specifications supply full and close details of almost every question of construction. Although the building is not erected in New York City, it was strictly of metropolitan style and methods, and was erected by Chicago contractors. For convenient reference upon any other points of construction not included in this example may be mentioned a handbook by J. K. Freitag, entitled *Architectural Engineering*, published in New York, by John Wiley & Son, and, London, Chapman & Hall, Limited, 1895. Naturally some developments have occurred in the few years since this book was written, in fact, progress is, in this department of science, very rapid; but nothing of primary importance has occurred.

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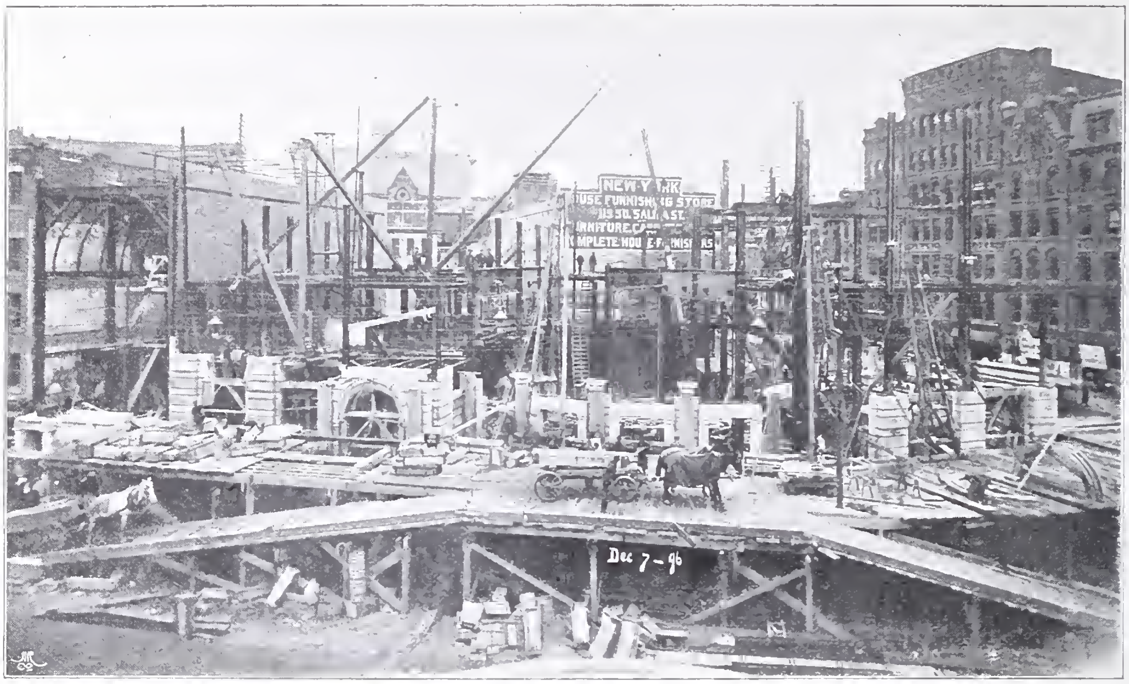
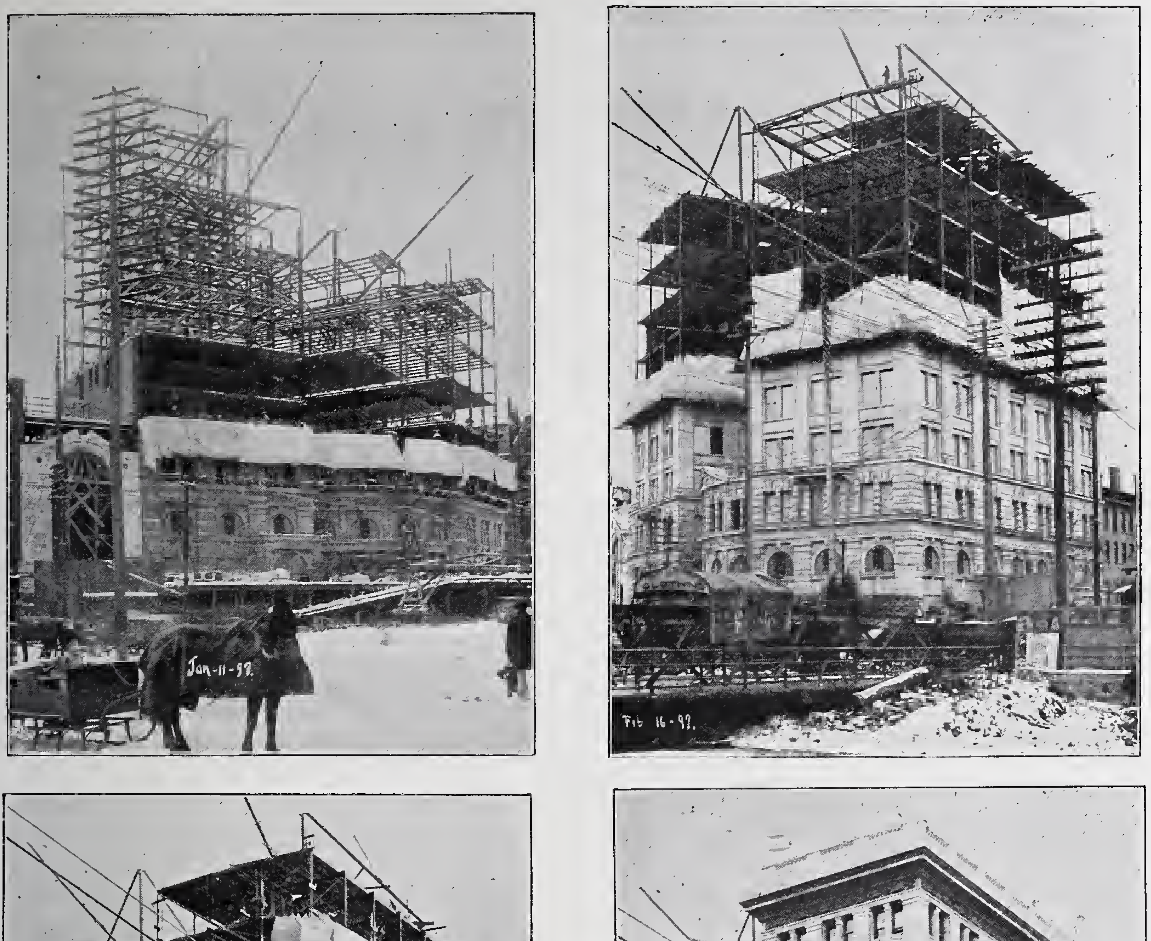
* The drawings, specifications, and diagrams referred to were exhibited in the Meeting-room.

In foundation work it is considered better in more recent practice to use heavy section rolled beams instead of railroad iron, and it is undoubtedly better to reduce the number of tiers of superimposed beams, and, if possible, construct each raft with one layer of beams and one collecting girder which really replaces the upper tier of beams. This girder is made as deep as space permits, and partakes of the nature of an iron base stool, with offsets much elongated in one direction. Mr. Freitag's book mentions certain forms of brick and concrete floors which are still used, and for which advantages are claimed. Other floors are constructed with light steel angle bars between the main floor beams carrying a light concrete covering, and finished underneath with a metal lath ceiling plastered in the usual way. Yet another floor uses metal ribs in segmental form between the main beams to secure the virtues of the arch, much like the old corrugated iron fireproof floors. Some patents have been secured, and are being worked, claiming advantages in certain mixtures of concrete, as, for example, one which uses wood sawdust; but the practical public verdict with regard to all the systems of fireproofing may be summarised in the statement that in an enormously large proportion, probably over 90 per cent., of all the work done some form of fireproof terra-cotta is employed, and nearly every architect, engineer, or builder, who is unprejudiced by interest in one form or another, will admit that on the whole the terra-cotta is the most reliable and the most satisfactory.



ONONDAGA COUNTY SAVINGS BANK, SYRACUSE, N.Y.



ONONDAGA COUNTY SAVINGS BANK, SYRACUSE, N.Y.

(R. W. Gibson, Architect.)

Throughout the above descriptions no mention has been made of porous terra-cotta. It should be explained that this form of material is preferred by many experts, as having better resistance to damage under either fire or water than the hard ringing terra-cotta. It is made by mixing the clay with sawdust, which, in the burning is, of course, destroyed, leaving the earthen material in cellular form. Many of its advantages are apparent without explanation; it will hold nailings, and is therefore used for roofing slabs, and blocks to support metal coverings which require holding by such methods. It is also used in brick and hard terra-cotta work for nailing blocks, just as wood blocks and plates were used in older brickwork. Porous terra-cotta nailing blocks enable the builder to entirely dispense with wooden blocks and nailings and bracketings, an improvement which is of vital importance. There seems to be no good argument against the use of porous terra-cotta throughout the flooring, partition, and furring work, except that in some localities it is rather more expensive, and although it may show slight superiority, yet the hard terra-cotta is so satisfactory that, where it is the cheaper form, it is quite justifiable to use it. In New York City most of the work is done with hard terra-cotta, using the porous for nailings.

The New York City building law is so imperfect that its revision is now in hand; but its stipulations as to thicknesses of walls, and strains in various structures and materials, may be taken as typical of American practice of conservative tendency. Many cities have laws less exacting, and doubtless the new law for New York will tend in that direction. New York law stipulates 100 lbs. per superficial foot floor load for office buildings; a few years ago it demanded 150 lbs. Most of the expert opinion to-day would agree that 75 lbs. is sufficient, with the provision that any single foot of the floor should be capable of supporting a larger load, say 500 lbs., the 75 lbs. referring to distributed load over the whole surface; the reason for this distinction is that an office floor is never likely to be loaded throughout with more than 75 lbs. per foot, and beams and girders of this capacity are undoubtedly sufficiently strong, yet a concentrated load, such as a burglar-proof safe, may be placed occasionally upon a limited surface, and the structure should therefore be of such a nature that this point of strain may be equal to the emergency, assuming that the surrounding surface is not loaded. In other words, the weakest point of a beam or arch (viz. its centre) should be capable of a centre load of considerable magnitude, as well as being proportioned to the distributing load first stipulated. Difference of opinion and practice exists in regard to column loads. The New York law requires that the whole of the theoretical load, amounting in office buildings to about 180 lbs. (80 lbs. dead, and 100 lbs. live), should be accumulated floor by floor upon the columns, that is to say, the lowermost column should be capable of supporting every floor above it fully loaded. The Chicago architects, however, have calculated, and their views are gaining ground, that the assumed live load of superimposed stories may be decreased in calculating the strength of columns as the number of stories increases. The assumption is that the greater number of floors, or the quantity of floor space in question, the less likelihood of the maximum load in office buildings and dwellings being reached throughout simultaneously. The Chicago law has recognised this principle, although no particular rule as to its application seems to prevail. In some cases the uppermost story is calculated with the full live load upon the beams (of course the full dead load is included on all members), and about 86 per cent. of the live load upon the girders and columns, then the next story with the same loads upon the floors and girders, but only 80 per cent. of the additional load upon the columns; the next story with only 75 per cent. of the load upon the columns, and so on down; so that in the case of a building of 15 or 16 stories, the lower columns in the first, second, and third stories are calculated for live loads on those stories of only three or four pounds, or in some cases nothing at all; and the foundation is accurately adjusted for the dead loads with no provision whatever for live loads, it having been found that a foundation, sufficient when new, acquires considerably greater strength to support temporary loading after having properly settled and taken its bearings. This may be a somewhat daring theory, but it provides a column in the lower storey which is sufficient for the full average load for the building, say, about 25 lbs. per square foot of floor surface, and the material is placed in the most scientific as well as the most practical manner; but it is argued by many authorities, especially in New York, that municipal regulation of buildings is unable to completely control their uses after they are finished, and that although a building may be erected for offices or apartments, parts of it are likely to be converted to the use of light storage or light manufacture or to other purposes, and a considerable margin should be provided to cover such contingencies. Some buildings have been designed with the live load calculated at 70 lbs. per foot on the beams, 50 lbs. per foot on the girders, 40 lbs. per foot on the columns, and nothing upon the footings; the dead load being, of course, included to its full amount, about 90 lbs. throughout.

The building by the writer, before referred to, was designed and calculated as follows:—

Load on all beams . . . . = total dead load + 70 lbs. per ft. live load.
Load on all girders . . . . = total dead load + 60 lbs. per ft. live load.
Load on columns of three upper stories = total dead load + 60 lbs. per ft. live load.
Load on columns of remaining stories . = total dead load + 40 lbs. per ft. live load.
Load on foundations . . . . = total dead load + 20 lbs. per ft. live load.

There is no doubt that the New York building law will permit of a decreasing percentage of the floor load upon the columns of many-storied buildings—and possibly a decreasing but never vanishing proportion will be the basis of the rule: as, for example, a reduction by 5 per cent. at each story of the total live load brought down from superimposed stories, the percentage being reckoned in each case upon the total, and not upon the original, floor loads; and of course, as before stated, the full dead load being included on every member throughout.

Another reason for abundant provision of strength in fireproof office building is the custom of building fireproof partitions, counters, and heavy desks upon the floors without special regard to their positions over beams or girder. A floor is rented by a bank, for example, and is loaded with a marble counter and steel fittings weighing possibly over 300 lbs. per lineal foot, or perhaps a partition with a very narrow base. These things cannot be prevented, and therefore should be provided for; their place cannot be anticipated, so the only provision is a general stiffness of the floor, which, however, need not be carried to the columns, except as already averaged.

As to the load on foundations, practice varies very much. The enormous pier loads showing considerable inequalities require an exact adjustment of their superficial area to the load to be supported, or else the building will be racked and cracked by unequal settlements. In Chicago settlements of four inches are not at all extraordinary; in New York one inch is quite frequent. If two piers are made with equal size base courses, and one is loaded with 500 tons and the other with 250 tons, the more heavily loaded pier will settle more proportionately than the lighter loaded one, and the building will be out of level, and will show cracks. This has actually occurred by reason of municipal regulations as well as because of too theoretical a view in calculations. Long since the days when it was recognised that the foundation must be proportioned to the load, buildings have been erected where one pier supported 520 tons of dead load, and another pier 500 theoretical tons, of which 200 were dead load and 300 live load, an arrangement which taught the lesson that a live load which was continuously absent would have no effect upon the building, and provision for it would be injurious. As a fact, such columns and piers have been found standing from one to three inches higher than their calculated settlement. From this position arose a custom of disregarding the dead load, by the experience, before mentioned, that a foundation, after it reached a certain age, would bear temporarily and within limits increased loads without any further settlement. Many Chicago buildings are so calculated with their dead loads equally balanced and with no provision at all for live loads, and in most cases it has worked well; but there is always the risk of a greater load being imposed, which would cause serious damage; in fact, it happened on one occasion that a warehouse had to be emptied most expeditiously, because the column foundations were sinking into the Chicago mud with dangerous speed.

The better practice undoubtedly is, to proportion the foundations to the true average load which they will have to bear, and which will be found to amount to 15 or 20 lbs. per superficial foot in offices and dwellings—sometimes something must be added to cover heavy decorations and finishings, such as marble wainscottings; but generally 20 lbs. will provide for this, and when added to the dead loads will not make the column foundations too large for their work. The character of the soil will, in some cases, permit without injury considerable variation in the load per foot upon the base course, but on all soft or compressible soils the problem is a very serious one when from ten to twenty fireproof floors are built upon them. Superfluous strength in the columns is not injurious, it is simply uneconomical; but superfluous strength in the foundation base course is positively a danger to the building. The only safe practice, therefore, is that which arrives most correctly at the actual load to be supported, and proportions the work accordingly.

Much of the above comment relates to construction, as such, distinct from the fireproofing; but the two are so intimately associated that they have been evolved one with and for the other. It is easy to see how the same principles of fireproofing could be applied to construction of a different nature, and it is evident that the experience gained in regard to the fire-resisting qualities of certain materials has its scientific value quite apart from its application to any particular method of building.

⁂ In addition to the illustrations referred to on foregoing pages, photographs, lent by Mr. E. O. Sachs, were exhibited showing the effect of great heat on unprotected iron columns. These were followed by a series of interesting diagrams, reproduced by special permission from *Engineering*, giving details of construction of a thirty-story building erected in New York.

DISCUSSION OF MR. GIBSON'S PAPER.

Professor Aitchison, R.A., *President*, in the Chair.

Mr. H. D. SEARLES-WOOD [*F.*], who, as Hon. Secretary of the Science Standing Committee, had read the Paper to the Meeting, referred to a telegram appearing in an evening newspaper that day, which he said afforded an interesting commentary on the subject under discussion. It was dated New York, 5th December, and read as follows:

> A disastrous fire took place last night in Lower Broadway, over a million's worth of property being destroyed in three hours. The fire was preceded by three explosions, probably of gas. It originated in the basement of Rogers, Peet, and Company's clothing house at the corner of Broadway and Warren-street, and this building was destroyed. The Home Life Insurance building, 15 stories high, which was contiguous to the southern side of the clothing house, had its eight upper stories gutted. The woodwork of the three upper storeys of the postal and telegraph office building next to the insurance office was damaged.

Mr. Searles-Wood, prior to the discussion, read the following extract from a letter he had received from Mr. Gibson:

"Since writing the Paper on fireproof construction, it has occurred to me that it presented some points with insufficient emphasis — as opinions instead of facts proven; and in regard to the main question, viz. the value of fireproof construction as therein advocated, I am tempted to add the following postscript relating two facts of greater value than any theoretical opinions.

"First. In the United States we have most ferocious fires, due partly to the dryness of the winter air. A fire can be kindled much more readily than is ever possible in England. But the condition of the air is best exemplified by a play experiment which I have frequently performed when the westerly winds come over miles of frozen country with little or no moisture in them. One can light a gas jet by the electric spark produced at the finger tip, upon touching the burner after shuffling the feet about the carpet!

"Another provocation of great fires is the great artificial heat required. Every room is supplied with hot air (or steam) sufficient to keep a temperature of 70 degrees when outside air is at zero Fahr., and, of course, all wood in a building is dry and warm.

"Second. Notwithstanding the above fact of the fierceness of our fires, there has never been in a fireproof building of the true protected class, a fire which has destroyed the structural strength or seriously endangered lives; but, on the contrary, several extreme trials by combustion of stored goods or adjoining buildings have been survived by such structures in most reassuring manner. The sensational newspaper reports have misled the public by failing to distinguish between first-class fireproof buildings and pretended fire-resisting buildings, some of which have failed badly, and serve to emphasise the value of the arguments for first-class work, and extreme rules in banishment of combustible materials and protection of iron and steel.

"If I can give any further information or assistance, please let me know. I should be delighted to render any service possible in this or any other direction of professional inquiry."

The following extract from a letter to the Secretary from Mr. Ewing Matheson, M.Inst.C.E., who had received an advance proof of the Paper, was then read:—

"The Paper has obviously been written from the American standpoint; and had I attended the Meeting I would have perhaps ventured to have drawn attention to two points. One, the reasons why concrete (of the many kinds and mixtures used here) is preferred in England to the hollow bricks or 'tiles' exclusively employed in the United States for fireproof floors. Secondly, the modern system of *riveted steel columns*, which are for certain purposes superseding cast-iron columns in this country as in the United States. In this regard, Mr. Shankland would do your institution a service if he could obtain for you the latest edition of Carnegie's book on steel construction. This, though avowedly a trade book, gives much useful information on the most recent American practice. Finally, you can hardly omit reference to the Paper read at the Institution of Civil Engineers by Mr. Shankland, on steel skeleton construction in Chicago. The safeguards against fire are fully dealt with in that Paper and in the discussion that followed.

"I take this opportunity of offering to your Library a copy of a new edition of my *Aid-Book to Engineers' Enterprise*, just published. Amongst a multitude of subjects which are of no interest to your members, there are some perhaps that may be useful."

Mr. P. GORDON SMITH [*F.*], Chairman of the Science Standing Committee, said the Paper was extremely instructive, and would be found useful by those concerned with the erection of large buildings in England. The point most difficult to deal with was the method of controlling the construction of such buildings so as to ensure reasonable security. Being concerned with the building law in this country, he had been trying to master the amended building law of New York, a copy of which accompanied Mr. Gibson's Paper. He was glad to find that that law was under revision, for it appeared to him a most complicated piece of legislation; he could not understand how the Americans could work it. One clause alone occupied some eight closely printed pages. He should like to propose a very cordial vote of thanks to Mr. Gibson for his Paper, and for the immense amount of trouble he had taken to put them in possession of all the details of such methods of construction.

Professor UNWIN [*H.A.*], F.R.S., said he had had an opportunity, during the World's Fair at Chicago, of having some conversations with two or three of the architects there who had mainly developed this system of construction. The question in the Paper was not whether they should build "sky-scrapers" or not; it had nothing to do with the question of the policy of building vertically instead of horizontally. That was a matter decided by certain business and social habits of which they were not judges. One building in Chicago he remembered had fourteen floors, with something like a hundred offices on every floor, and on a moderate computation there were generally some seven thousand persons at one time in that building. American business habits seemed to demand that all those persons should be within reach of each other rather than in two or three different streets. The Paper dealt almost entirely with the question of the use of iron construction for strength, merely masked by more or less brick-work and terra-cotta. Chicago examples were rather different from those of New York. In this style of building every load was carried on a steel beam, and transmitted through a steel structure to the foundations. The walls were mere panels, no thicker on the lowest floor than on the highest; they were simply put on to a steel structure. That was a system of construction there was no chance of having in this country, but it had been very successful in America. The first objection was as to the expansion and contraction of the steel. But that had proved no difficulty at all. The panelling was so done that the steel expanded and contracted independently, and there was no dislocation of the building from the expansion. But in Chicago they had a difficulty which had never been met with elsewhere. Those immensely tall buildings had been put upon about the worst foundation to be found in the world—that is, on a comparatively thin bed of clay about twelve feet below the ordinary ground-level of the town. The Paper spoke of there being only a settlement of four inches; but he believed the common settlement in these buildings in Chicago was eight inches, and there were instances of eleven or twelve inches of settlement, and that settlement went on so regularly that it caused no extreme difficulty. That uniform settlement was counteracted by having extended iron and concrete foundations, and by fulfilling two fundamental conditions: first, that the average pressure on any square foot never exceeded from 3,000 to 3,500 pounds; secondly, that on every piece of foundation the centre of gravity of the foundation and the resultant of the load were at the same point.

Mr. LEWIS SOLOMON [*F.*], in seconding the vote, observed that they had to thank Mr. Gibson for his great kindness in sending over to them four different things—namely, first the Paper read, secondly the diagrams, thirdly the two blue diagrams which he would explain later, and fourthly the specification, 219 pages long, of the building put up by Mr. Gibson. The main thing that struck him about the specification was its completeness. It included a list of all the stanchions and girders used in the building. They were not only shown on the drawings, but lengths and sizes of every one were detailed. There was also a complete specification of the electric light—every possible thing wanted in reference to that was described. It included, too, a specification of the heating, and every radiator and every pipe required in the building—all given before starting. There were many differences from the English practice observable in the specification. Portland cement was used in the proportion of one to two parts of sand. In England they used more frequently three, four, five, or even six to one; so two to one seemed a great waste—if the Portland cement is good. Then the bond was different: Mr. Gibson specified that the bond should have two headers at every fifth course, which would not be permitted in English practice. Next, the white glazed brickwork was put in in white cement, whatever that was, whereas in England they set it in putty as a rule. The next thing was very different from English custom—"that the masonry must be carried up on all sides together, no part being more than two storeys in advance of any other storey"! The next difference was a very good one indeed—the masonry was carried up 1 inch above the iron uprights to allow for shrinkage. He called that very good, because the London Building Act laid down that every girder must rest on a stanchion and brickwork, which was a most unscientific and silly method of construction, for iron did not shrink at all, while brickwork always did. The next thing to be noted in the specification was that the floor of the basement was to be 4 inches of concrete, then asphalt, and then 4 inches more of concrete. That seemed to be a very good arrangement, for it prevented the asphalt blowing up at any time. Then there were waterproof vertical walls built according to a method that would not be allowed by any district surveyor in London, there being a straight line between the outer and inner surface of the wall, so that the outer half of the wall was not cross-bonded to the inner half. Sashes, again, were specified to be of galvanised iron. Another noticeable feature in the specification was the enormous quantity of copper work. In reference to this, he remarked there had been introduced lately the method of construction of the Luxfer Prism, where the glass was kept together by a deposit of copper—an American invention, showing the extensive use of copper over there. The next thing was the use of cast-iron templates 12 × 8 × 1 in some sizes, and $20 \times 12 \times 1\frac{1}{2}$, and $24 \times 12 \times 1\frac{1}{2}$ in others. In England such a thing as a cast-iron template would not be trusted. Either stone or wrought iron would be used. Cast-iron risers were used for the staircases, with marble treads. That had frequently been pointed out to be very dangerous in case of fire. Then in the best staircase a cast-iron hand-railing was used, which was also very unusual in England, where wrought iron or wood or marble would be used. Then the floor was described as seven-eighths of an inch in thickness, and two-and-a-half inches wide, tongued and grooved in addition, which thin boards at home they would hardly use even in poor buildings. Then it was specified that under wood flooring well lapped building paper was to be placed. Perhaps some member who had been to America would explain that; he did not know himself how it was used. There was very little joinery work in the specification. Best French plate-glass was specified, which was never heard of in England, where either English or Belgian plate-glass was used. Then all outside brickwork was specified to be painted certain colours, which was unusual in home practice. In the matter of terms there were some noticeable differences. What we called brickwork they called masonry. They talked about the wainscoting of walls where we should say covering walls. They used it in the sense of covering, as with plaster. Then they used the word "columns" where we should say stanchions. Coal-shoots they styled coal-"chutes." They spoke of vault-lights instead of pavement-lights. He had also made some notes with regard to the fulness of their specification. On page 64 it spoke of the factor of safety for cast-iron being one to five, with a factor of compression of 80,000 lbs. Not many English architects would put that in their specifications. The figures exactly agreed with what Adams gave in his book of iron construction, which was usually considered the proper thing. On page 68 the factor of safety for steel was given as one to four in posts, and 12,000 lbs. to the inch. That was only half what we should put. On page 91 the factor of safety for cast-iron finishings was given as one to six, with the same factor on compression as before. Mr. Solomon then dealt with the advantages of the use of the "blue diagrams" already referred to, on which were set out in tabular form the dead load, live load, and column load on every floor, accompanying his explanation by figures and diagrams chalked on the blackboard. The great advantage of the use of such diagrams was that mistakes of calculation were at once evident and easily discoverable.

Mr. R. I. G. READ, M.Inst. C.E., said that the great difference between American construction and English construction consisted in their regularity in going to work and their dealing with the subject in hand in a scientific manner. In dealing with the steel construction of a building in England the engineer could never go straight ahead with it. He had never had a single building in his practice in which it would have been possible to lay out such a symmetrical form as Mr. Solomon had described. Often the front of the building had to be carried on steel stanchions which were only one story high, and upon them came a wall perhaps 2 feet 3 inches in thickness, and that wall went right up, reducing to gradually 9 inches at the top of the building. Then there would be brick walls in various positions in the back of it, and the girders were required at all sorts of places, some of them having to rest on brickwork and some on stanchions. In a large five or six story building he had had to do with recently, the firm who carried out the ironwork, although it was comparatively straightforward work, told him that there was not really one girder alike in the whole building! And that was the case—there was not one girder symmetrical, and that was the general type of construction in England. English architects, it seemed, were afraid to take the bull by the horns, and let the engineer design the steelwork and erect it first, and get out of the way of the brickwork contractor, who should come in afterwards and fill up. With regard to the fireproof construction, it seemed to him, from the section given of it, that although it might be very effective, it was very deep compared with what we were used to here. The great tendency in buildings he had had to do with was to reduce the thickness of the floor construction and to widen the space between the joists. In one, a warehouse five or six storys high, the fireproof flooring was laid on joists which were about 15 feet apart one way, and 13 feet another, and the thickness of the concrete was only about 4 inches. That had been done by Stewart's Granolithic Company. It was marvellous how much these floors would stand if perfectly done. They were not wholly concrete, but were composed of concrete and iron or steel wires of a certain thickness to take the tensional strain.

Mr. R. LANGTON COLE [*A.*], referring to the terra-cotta arches, asked if the materials were to be had in London in sufficient quantity without having to wait an unreasonable time for them. With regard to the wire glass, which had lately been introduced into London, he had tried to get it, but found that it was not made here more than 2 feet square. He had a number of skylights to cover over 6 feet square, but he was told that it was impossible to get glass even 4 feet × 2 feet from America in less than thirty days. That was not the way to introduce new material. If Mr. Searles-Wood could tell them where to get the material at moderate prices, the information would be of great use to them.

Mr. LEWIS SOLOMON observed that he had used a great deal of the wire glass in England for two years. It was made in England by Pilkington, of St. Helens, and in Berlin by Siemen Bros.

Mr. C. H. BRODIE [*A.*] thought the demand for terra-cotta was not extensive enough to induce English manufacturers to make it in such large quantities as they did in America. The building paper that Mr. Solomon referred to was largely used in the States. There were a large number of frame houses built almost entirely of wood, and the outer covering was of weather-boarding, and underneath that was always placed a layer of the paper, which was very similar to the Willesden paper used here.

Mr. E. O. SACHS thought it desirable that illustrations should be obtained showing how the terra-cotta material referred to behaved in a large fire or when tested under practical conditions.

Mr. BRODIE, continuing, said that Mr. Solomon had spoken of the amount of copper specified. That would probably be found to be taken up by the roof. The buildings had flat roofs, and the roof in the best buildings was covered with copper; but the copper was simply soldered. In New York in winter the temperature sometimes reached 40° below zero, and in summer it went up to 120° day after day. Yet the roof stood these extremes, and kept water-tight. That was not to be marvelled at with copper, but there were hundreds of such flat roofs simply covered with tin. There was a specification in the Library which described a tin flat roof, and that material lasted in spite of enormous differences of temperature. It was only of ordinary thickness, and was painted.

Mr. C. E. BARRY [*A.*] said he had, while in the United States, specified that roof covering himself many times. The material was thin sheets of tinned iron. These were jointed in one of two ways, either with what were called "standing lap joints," about one inch in height, and somewhat similar to those used here in zinc work; or, more commonly and more cheaply, by soldering the edges of the sheets together. In all cases, of course, the roof covering was laid "to fall."

Mr. DELISSA JOSEPH [*F.*] said that the opportunity for the practical application of this system of construction in England was very small; they would probably never have occasion for erecting buildings to such an enormous height. He had carefully studied the subject to see whether they could employ in London, with any advantage, a frame of skeleton construction in warehouse work; but he could see no advantage in it, because they would be bound to cover so much of the area of framework with a solid construction, in order to meet the requirements of the Building Act. Supposing it were claimed that a steel frame construction would give a great amount of light in very narrow streets—practically making a conservatory front—it could not be applied here, because they would have to case in with false material so as to come within legitimate ratio of open space to solids. As regards fireproof construction, under present circumstances they would hardly be disposed to introduce more extensively fire-resisting construction than they were actually compelled to do by the literal interpretation of the Act, because the fire insurance companies offered no encouragement to do it. He spoke with some knowledge, because, after the Cripplegate fire, the Goldsmiths' Company, as the freeholders of that area, called a conference of architects and fire insurance companies' representatives to see whether an arrangement could be come to whereby, in view of the introduction of every possible method of fire-resisting construction, the fire insurance offices would materially reduce their rates. Many conferences were held, and he was appointed one of the four architects on a committee with two or three representatives of the fire offices on it. Nothing practical resulted, however, because the insurance companies had put their heads together and said that as there were really risks, as proved by the fire at Cripplegate, those risks must be met by excessive rates, and these rates must be maintained in the face of all opposition. He had suggested that the insurance companies should themselves define what they would consider a perfect building, to be insured at the lowest rate, and that any departure from the model should be considered in the rate to be imposed; but they refused to give themselves away. They practically set up an old schedule whereby certain concessions were allowed on certain points being met. But on all those points being met, the rates still remained excessive, because it was not so much that they wished to arrive at any rate in relation to the construction, but in relation to the risks of the area. The area was all that influenced the minds of the insurance companies. In Cripplegate he had introduced a fireproof building, and he had done it in the interests of his clients, so that they might feel happier in the possession of a building which would resist all reasonable attacks; but the building had cost about 30 per cent. more than it otherwise would have, and they had little hope of getting a concession from a tariff office towards compensating for this additional outlay. So long as the gross monopoly enjoyed by the fire insurance offices was allowed to exist, and so long as they were able to establish rates against which there could be no competition or appeal, so long would they be discouraged here from introducing a system of practically perfect fire-resisting buildings such as had been illustrated in Mr. Gibson's Paper.

REVIEWS.

M. AUGUSTE CHOISY'S HISTORY OF ARCHITECTURE.

Histoire de l'architecture. By Auguste Choisy. 2 *vols. la.* 8o. *Paris,* 1899. GAULTIER-VILLARS.

M. Auguste Choisy, our Hon. Corresponding Member, has presented his *History of Architecture* to the Institute. It is in two large and thick volumes, together containing 1370 pages. Everyone is anxious to see this work and to read what M. Choisy has to say on the architecture of the different countries and epochs; as he is famous throughout the architectural world from his discovery of the methods of building used by the Romans and the Byzantines. From his being one of the chief engineers of roads and bridges at Paris, his knowledge of construction is as complete as his acquaintance with the working and setting of materials; and he has witnessed their use in Europe, Asia, and Africa; while by his literary powers he is able to present his knowledge and his discoveries in a lucid and attractive form.

The late Dr. Middleton considered his work on Greek epigraphy one of the most valuable contributions we have to the knowledge of Greek symmetry.

M. Choisy's remarks on M. Dieulafoy's work on Susa were most valuable contributions to the origin of doming. I can speak of the literary ability shown in his book of travels in Asia Minor, and the powerful picture he has drawn of the desert in his *Sahara.*

It would take a year to read critically his *History of Architecture,* and I have only been able to look at the plates and to dip casually into the text.

The explanatory introduction showing the method of raising huge stones by prehistoric man, and the impossibility of working them with the tools in use, is profoundly interesting. The possibility of ornamenting tolerably flat stones with a flint point, when it was impossible to work or shape the stones, is also new and striking, and the account of the earliest buildings made of wattles and clay is also most interesting. The discovery of lime mortar appears to be lost in antiquity.

On the subject of ornament he says, "Man of the glacial epoch, who scarcely built at all, occupied the leisure of his existence as a hunter in reproducing on his arms the shapes of animals, and rendered with striking truth their movement and life; by a strange exclusion, he never borrowed his models from vegetable forms.

"The invasion which brought the metals cut short this first attempt; with them imitative art suddenly disappeared. The man of the polished stone age, of the great stones and of metals, became an absolute stranger to the representation of figures. From the appearance of this Asiatic people the idea of grandeur effaced the abstract idea of beauty. Craftsmanship supplanted Art: the perfection of workmanship replaced the elegance of decoration. In the former age they engraved their arms; afterwards they smoothed the surfaces with a burnisher, and by a phenomenon of survival, worthy of remark, we see that the first bronze instruments reproduced the traditional shapes of flint implements by pure imitation. Thus we see Greek art itself recalling in its stone architecture the forms of wooden construction." (Vol. i. p. 7.)

On Chinese architecture the author remarks, "that on account of the rainy climate of China the houses have to be protected by a covering offering an assured drainage for the rain," and says, "China is the first country of Asia which shows the systematic employment of sharply sloped roofs." He treats of the use of bamboo, and explains the curious shapes the roofs take by the bending of the bamboo timbers, and shows some examples from *The Chinese Art of Building.*

The tracing of the influence of the architecture and arts of different countries on the people who overran them is most fascinating.

"The annals of China preserve the remembrance of its very ancient relations with Western Asia. Pautier has translated the story of the campaigns of the Emperor Mou-Wang across Western Asia. . . . In the tenth century before our era, that is to say, at the epoch of the Chaldean civilisation, then in all its splendour, Mou-Wang invaded Chaldea, overcame the Hittites, and penetrated to the Mediterranean, and established over the countries of Mesopotamia a Chinese protectorate which lasted for more than sixty years. In the course of his expedition Mou-Wang admired the towers in stages, and he brought some architects to erect similar monuments in China; these would be the first models of those terraced sanctuaries of which the Temple of Heaven is a distant imitation, and from which were derived the pagodas in stages.

"Mou-Wang interested himself in the painting of wood, and in the making of varnishes: the decorations in lac were derived from a Chaldean industry. Enamel was known to the Chaldeans as well as to the Egyptians: it is to the Chaldean expedition that this practice of enamelling was due, which became in China the art of porcelain." (Vol. i. p. 195.)

Greek architecture has a large space allotted to it, both on account of its own perfection, and because it was from it that the Romans learned some of the elements of architecture which they combined with what they had learned from the Etruscan, and with the outcome of their own genius.

The Greek Doric is very completely gone through, as it deserves to be, being the finest architecture man has yet invented and carried to perfection.

The Ionic and the Corinthian, though not equal in artistic subtlety to the Doric, have been brought to a perfection of their own, which entitles them to be classed as orders.

As to the original material of which the Doric was made, the author does not doubt of its wooden origin — for who could when we have Pausanias's testimony to the originals in oak being still preserved ?—and thinks that its flutes are as likely to have been taken from an adzed tree-trunk as from Beni-Hassan ; he has, too, read all the literature on the subject down to the open Metopes spoken of in the *Iphigenia in Tauris.*

The Ionic, as the Greek perfecting of the Phœnician lotus capital, is also gone into most thoroughly, and the exquisite and delicate grace of the Ionic fully justifies its being compared to woman, as the Doric is to man. He disposes of one of Professor Ussing's objections to the ignorance of Vitruvius by giving an Ionic entablature with triglyphs from Aezani, in Phrygia.

There is a happy suggestion about the Corinthian cap ; that Kallimakos, being a goldsmith, probably made the foliage of the Corinthian capital in metal.

M. Choisy also goes into the much-vexed question of the hypæthros, and is of opinion, as a rule, that Dr. Dörpfeld's contention is right, that the temples were unlit. He thinks, however, that there may have been a hypæthros in very long temples, where the rays of the rising sun would not sufficiently illuminate the idol, and does not even positively deny the possibility of the adoption of the clerestory windows of Fergusson and M. Chipiez.

As far as I have dipped into it, the book is more interesting to an architect than most novels, and gives a better insight into architectural history than any book I have seen. The author shows, too, his usual sagacity and judgment in many debatable points, and has no favourite theory of his own to advocate with or without reason.

I think M. Choisy is to be congratulated on the completion of his laborious task, and the students on having so complete a work.

G. Aitchison.

ITALIAN RENAISSANCE ARCHITECTURE.

The Architecture of the Renaissance in Italy, a General View for the use of Students and others. By William J. Anderson, Director of Architecture and Lecturer at the Glasgow School of Art. Second edition revised and enlarged. 8o. Lond. 1898. [B. T. Batsford, 94, High Holborn.]

In Vol. IV. 3rd series, No. 7, of the Journal (4th February 1897) an attempt was made to notice the first edition of the above work. So rapidly has that edition been disposed of that it has been found necessary to produce another, and it seems desirable to welcome the new edition, for the author himself now tells us that his meaning has been made clearer, and errors into which he had fallen have been rectified.

A glance at the new volume will at once show us that this is so, and that a very large number of photographs have been added, and some more of the author's own sketches have been included.

In the "Note to the Second Edition" we are permitted to know something of the author's mind in regard to his work. During the interval since he first undertook to lecture on the subject there has evidently been unfolded to his mind a mass of Continental literature on the architecture of this period, of that precise and painstaking sort which is so rare to find in this our day in English writers on architecture. The result of this study apparently had the effect of creating a desire to recast, if not to extend, the method originally adopted by the author when addressing "students and others" through the volume under consideration. He has in this edition so far followed this instinct as to present a better statement of Brunelleschi's work, and has extended, if not re-written, the second chapter, and has rounded off the notes on St. Peter's at Rome by a few words on its historical position (page 107). The "Introduction," too, has been cleared up and very slightly extended with that in view. All this has benefited the volume to a considerable degree. It would have been a pity to change the character of the book ; as it stands it occupies a position much required at the present time ; without being too technical, it fosters inquiry in a field hitherto singularly neglected.

The last half-century has witnessed such a chaos of confusion in architectural taste that a sort of blindness has come over students and others at the very time when easy and inexpensive means of travel have been opened to us on the Continent, and this book would be of the greatest service to assist in lifting the veil ; its size and popular treatment of the subject would make it a really valuable companion on a continental journey.

Having said thus much, it may be as well to add that the indications of what is passing in the mind of the author lead one to hope that something more may come to us on this subject from his pen.

It is clear that during the last few years, since the delivery of the lectures on which this book is founded, a more extended study of architectural literature has formed the mind of the author, so to speak, afresh. In front of the title-page a work is noted as being "in preparation by the same author" on the architecture of Greece and Rome. The study involved in its production ought to give us the very thing we asked for on the former occasion when the first edition was noticed in the Journal. "Is it not," we said, "possible to pick up the thread which was dropped when those all-absorbing experts Vignola and Palladio drove all before them by the scientific exposition of the systems that are connected with their names? There can be no question that definite principles governed the productions of the earlier masters, just as the works of the generation which followed were governed by the principles inculcated at a later period. But what were these methods, and where in writing are they to be found? It would be well worth while for some one to conduct a searching investigation into the grounds of what has been suggested. That there is a *primâ facie* case for inquiry is clear enough. The family likeness evident in the buildings erected by the early masters is sufficiently clear to indicate a common source from which their principles were derived—or rather which they elected to make use of in common. Was it that the genius of these great men, after deep study of the classical remains of the past, evolved a system which, while resting on antiquity, inaugurated a fresh departure that has not yet the chance of diffused acceptance? If so, let us see what can be done before the generation educated in the study of classic art—and there are still some who remain to us—passes away." To this appeal there has as yet been no response; we are still waiting for an answer. Mr. Anderson, fresh from the study of Greek and Roman architecture, is surely in a position, the very position, to explain how it came to pass that the Quatrocento architects, the instant the remains of antiquity came to be studied, with common consent and without delay proceeded to utilise the experience thus given to them, which apparently they interpreted in the same sense. This second edition of the "Renaissance in Italy" shows an earnest appreciation of the special period alluded to; has he not rewritten or recast the chapter which deals with it, and has he not rewarded us by introducing special notice of the Badia at Fiesole, of which he gives an illustration specially made for this edition, with a suggestion as to the thirteen diameters of the order at the intersection of the transepts in that church? All this sets the mind on the alert for information of a more extended character on the subject of the training of these pioneers of the Renaissance.

It is evident that the book now under review expresses the personal impressions of the writer on the buildings as they struck him on seeing them. That the opinions expressed coincide with those of high French and German authorities does not detract from the value of his conclusions, nor does it follow that they are merely a collection of the pronouncements of others. The book, at any rate, is clearly original, and the result of careful study *on the spot*. This method of study is the one thing needful. What a pity it is that our younger members are in such a hurry on their continental travels. Money would go further and knowledge would come in more freely if they would select a district and *live* in the villages for a week at a time whilst really studying the buildings. Then if a matured exposition of the methods by which the old masters produced these works was forthcoming based on the architecture from whence they derived their inspiration, material would be to hand for a further advance in the same direction. We should then not need the constant warning against copying. Copying for the purpose of study is the reverse of reprehensible; copying for purposes of reproduction is only worthy of the electro-plater. Enthusiasm for our art is the one thing essential to induce our countrymen outside the profession to take an interest in it. That they are capable of it is clear from what has taken place in England during the reign of the present sovereign: architecture floated in on the top of the tide. It is true that it was Gothic architecture on which the mantle of appreciation fell, but the strange movement could never have gained the position it held for nearly fifty years but for the genuine Belief of those who have had to work it. The style had been a sealed book for years till a few enthusiasts reopened it. One of them, the late Augustus Welby Pugin, once told the present writer that, in answer to the question, "How came you to imbibe the principles of an art so absolutely dead?" he had replied, "I *lived* in those great churches." By that he meant that the casual and hurried visit can never produce the effect on the mind requisite for the assimilation of the meaning which any building worthy of the name is designed to convey.

In applying this to the book before us, it seems reasonable to conclude that something of this method has prevailed to produce it, and it will have worked its purpose if, by using it, others are induced, first, to make acquaintance with some of the early buildings mentioned, then to obtain like impressions concerning them, and, lastly, when later on our author proceeds to draw conclusions from ancient precedents, to vie with him in working out the precious secret by which the architects of the early Renaissance achieved their success.

We are again to be congratulated on the liberality with which Mr. Batsford, the publisher, has afforded still more illustrations in elucidation of the text; whereas in the first edition there were fifty-four collotype and other plates with seventy-four illustrations in the text, there are in the second edition sixty-four of the former and ninety-eight of the smaller illustrations, and several are improved impressions freshly taken.

If a further edition be called for, thinner paper and a less heavy binding might with advantage be substituted.

LENOX PRENDERGAST.

NOTES, QUERIES, AND REPLIES.

Durham Cathedral and Documentary Evidence.

From John Bilson [*F.*], F.S.A.—

Mr. Bond's interesting paper [pp. 17–29 *ante*] deals with such a large number of examples that he will scarcely be surprised if his deductions from architectural evidence are not in every case entirely accepted. I wish to refer to his remarks on the history of the Norman cathedral church of Durham [pp. 20 and 22 *ante*]. The documentary evidence here is much more complete than is the case with most of the great Norman churches, and it affords an invaluable point of departure for dating other work of the end of the eleventh and beginning of the twelfth century. The recorded facts fix certain definite stages in the progress of the building, which are not in the least in conflict with any architectural evidence. Of the two chroniclers in question, Symeon was a monk of Durham, and must certainly have been an eye-witness of the work he records (see Rud's essay in Bedford's edition of Symeon, 1732). The continuator, whose work covers the period from 1096 to 1144, was probably also a Durham monk, and was an eye-witness of many of the incidents he relates. Their evidence, therefore, cannot lightly be set aside.

They tell us that Bishop William of Saint-Calais commenced the rebuilding of the church in August 1093, and that, when his death (on 6th January 1096) put an end to the agreement by which the bishop had undertaken the erection of the church and the monks that of the monastic buildings, the monks devoted themselves to the works of the church, which, when Ralph Flambard became bishop in 1099, had advanced as far as the nave. The choir was so far completed in 1104 as to permit the translation of the body of St. Cuthbert to the shrine at the east end. Flambard proceeded with the works *modo intentius modo remissius*, and when he died in 1128 he had carried up the nave as far as the vault. In the interval between his death and the accession of Bishop Geoffrey Rufus in 1133 the monks completed the nave.

Of the state of the works when Bishop William died in 1096 they tell us nothing. I quite agree that too much work has been assigned to the two-and-a-half years preceding the bishop's death, but the documentary and architectural evidence taken together justify the belief that the choir and east side of the transepts, as far (speaking broadly) as the top of the triforium, are the bishop's work, and that the west side of the transepts must be attributed to the monks. With the latter we must necessarily put the abutting bay on the west side of the crossing. I think it is impossible to attribute the whole of the lower part of the nave aisle walls to Bishop William (as Canon Greenwell suggests); the alteration in the width of the nave bay beyond the third half-bay west of the crossing (which, of course, applies to nave and aisle walls alike) alone forbids this assumption, for an alteration of this kind must certainly have been made while the nave was in progress; and there are other reasons against it. The choir was not ready for the translation of the body of St. Cuthbert until 1104, and William of Malmesbury's account implies that the vault over the shrine at any rate was then completed. I think the whole choir was then vaulted, for there is little doubt that the whole work was of one date.

With regard to Mr. Bond's remarks on what Symeon's continuator says of Flambard's work in the nave [p. 20 *ante*], the passage runs thus: "His namque sumptibus navem ecclesiæ circumductis parietibus ad sui usque testudinem erexerat." It appears to me to be quite clear that *testudo* cannot refer to the aisle vaults, and the architectural evidence alone contradicts such an assumption. We have works in the cathedral erected by Flambard's successors, Geoffrey Rufus (1133–1140) and Hugh de Puiset (1153–1195), the character of which amply confirms the plain reading of the documentary evidence that the nave was finished (and vaulted) before 1133. The absurd theory that the nave vault was erected in the thirteenth century was apparently based on a vague statement by Leland, which certainly does not warrant the idea. There is absolutely no evidence to show that the nave of Durham was ever actually covered with a wood ceiling; the clerestory was palpably designed for the vault, and the vault is quite clearly of the date which Canon Greenwell attributes to it (1128–33). I propose, however, to deal with the question at length in a Paper shortly to be submitted to the Institute.

Architectural Evidences in the Galilee at Durham.

From William White [*F.*], F.S.A.—

I should like to add a few words to what I endeavoured to make clear at the Meeting of the 21st November in reference to the Durham Galilee.

Historians, antiquaries, and amongst them legal experts of high standing, have no hesitation in speaking of my theory* as "not holding water," as being scarcely worth a momentary consideration. On the one hand they maintain that the contemporaneous historical evidence of its having been built as a Lady Chapel sets the whole matter at rest. The expert lawyer says it could not have been built for a court of any sort, and certainly not a court for twofold jurisdiction; for "no precedent" can be found, in any historical record, of two kinds of court, secular and ecclesiastical, ever having been held in the same building! It does not seem even to occur to him that there never was, and never could have been, the same condition of things to create a precedent, excepting, perhaps, in the case of Ely, where also the Bishop was Prince Palatine as well as Commissioner for the other half of England during the King's absence. There might even have been in the Galilee an altar dedicated to the Blessed Virgin; but the Galilee could not have been built simply *as* a Lady Chapel. Its position, its structure generally, its Latin inscription over the main portal from the nave of the Cathedral, and the special provision of a prominent feature, significant of a Court of Judicature in its original construction, all alike point to a very definite though very different conclusion as to its purpose and use. Yet no antiquary, old or young, learned or unlearned, ventures to meet the case fairly in attempting either to controvert these facts, or even to establish the truth of the historical tradition.

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* See Lecture in Transactions, Vol. VI. N.S. (1890).

It is easy and pleasant enough to take the established tradition unquestioning and unquestioned. But it is quite impossible to accept it as it stands without some material corroborations. It ought to be, for example, to some extent proved that the alleged miraculous interference, which has been made a material part of its history, actually took place. There ought to be some good ground for supposing it to have been a genuine miracle, and not a mere *ruse* invented simply to justify the removal of the materials (whether for the same or for some other purpose) of the Lady Chapel, which had been already commenced at the east end. Then some further explanation is needed as to what purpose, in a Lady Chapel, such a seat as that could serve, the structural back of which is still in existence, with its arched recess, and with its pictorial representations of the living symbols of civil and ecclesiastical authority and jurisdiction. Against the structural evidence now adduced it needs to be shown that Pudsey's recorded intention of building it *as* a Lady Chapel was duly carried into execution, as the building itself was. It needs to be proved that at that day, and under such exceptional circumstances, the erection of such a tribunal was well-nigh impossible, or at all events extremely impracticable and highly improbable.

The explanation sometimes given (that the invention of the miracle was but a playful mode of justifying the removal, in reality necessitated by discovering the insecurity of the foundations at the east end) would unquestionably cast a doubt also upon the rest of the story, in the purposed transposition of the building *as* a Lady Chapel, without some further evidence to the contrary. The failure of the foundation needed no miracle to justify the removal. It becomes a mere superfluity, introduced for some unknown and unacknowledged purpose. There could be no need for spirits, whether embodied or disembodied, whether evil or angelic, to pull down at night what was put up in the day. And no "legal precedent," from any existing record, has been quoted to indicate that such a proceeding might naturally and properly be expected to take place!

The suggestion made by the lecturer, that such erections as Galilees, or large porches, might well have been used for many other semi-ecclesiastical purposes, such as the payment of tithes—or of manorial quit-rents and other dues—is one that I myself made in my lecture on the Galilee [TRANSACTIONS 1890]; and I think I may say, without danger of contradiction, that the Lady Chapel is about the last part of the church that would be appropriated to these uses; still less would the Lady Chapel be built externally to the Cathedral with a special view to its being converted to such purposes. This, too, certainly serves as a forcible corroboration of my view rather than a refutation of it.

Documentary and Architectural Evidence.

From WILLIAM PAGE, F.S.A.—

If I might be allowed to suggest it, I think Mr. Bond, in his most interesting and instructive Paper on "The Comparative Value of Documentary and Architectural Evidence of English Cathedrals," has too great a tendency to bring all documentary evidence under one head, whereas, as in all matters of historical research, we find a considerable difference in the trustworthiness of the sources whence information is to be obtained. It is natural that all chronicles should not be of equal value, and therefore the accuracy of each must be taken into consideration before accepting the evidence it contains. As Mr. Bond suggests, some of the chroniclers perverted the truth to suit their own fancies, and wrote carelessly of events which occurred centuries before they lived. It is, however, quite a different matter with what may be termed official records, such as the accounts of the obedientiaries of monasteries, fabric rolls, works accounts, charters, writs, &c., which will be found almost invariably to tell the plain unvarnished truth, and the errors which have been made in forming conclusions from such documents are seldom the fault of the records, but of those who have consulted them. By the investigations of Professor Willis, Mr. St. John Hope, and others, we are beginning to understand the proper interpretation of the words used by the mediæval workmen, and as the classes of records above alluded to are becoming more available, as they now are by the better arrangement of the Exchequer accounts at the Public Record Office and of the numerous account rolls in the possession of the various deans and chapters and other bodies, they will be found to contain material of the very highest value when used in conjunction with the architectural evidence. Mr. Bond makes it clear, however, that the one must be used to interpret the other.

Erratum.—Page 34, line 46, 2nd col.: *for* Mr. Grose *read* Mr. Gough (*Mon. Antiq.*)

Moonstones.

From James Burgess [*H.A.*], C.I.E., LL.D.

Mr. W. Simpson, in his notice of Mr. Bell's *Reports of the Archæological Survey of Ceylon* [*ante* p. 15], calls attention to the succession of animals which occur on "moonstones." Now moonstones, it is explained, "are large semicircular slabs at the foot of the steps leading to dāgabas or image-houses." Fergusson (*Ind. and East. Archit.* pp. 196–7) says "moonstone" is the name by which they are popularly known in Ceylon, "to which they are quite peculiar." And Mr. Bell (*Rep. on the Kēgalla Dist.* 1892, p. 19) speaks of them as "those adventitious ornaments peculiar to Ceylon temples." The Singalese term for them seems to be *sanda-kada-pahana*.

But this sort of carved step (or stone mat) in front of a shrine or temple door is by no means peculiar to Ceylon; it is found, more or less richly sculptured, in the cave temples at Ajantā and elsewhere, and in Dravidian and other temples over most parts of India. It always occupies the place of a door-mat, and is known, I think, in Hindu architecture as *padmāśila*. This word, however, appears to have as yet escaped our Sanskrit lexicographers.

It seems to me somewhat of a stretch of imagination to connect directly the animals carved on Singalese door-steps with those from representations of whose *heads*—carved in silver, gold, lapis-lazuli, and crystal respectively—the waters of the fabled lake Anavatapta (Sing. Anottata-vila) were said to issue as the sources of the Ganges, Indus, Vakshu or Amu-darya, and Hoang-ho. That lake—one of the seven great lakes in Himavanta—has been variously supposed to be the Rāvanahrad or Rākhas-tāl, the Manasarovar or lake of Mapam, both in Nari, and even the Sarikkul in Pamir. But as to the animals: in all Hindu legend and art the bullock or cow, elephant, horse, and lion, are sufficiently prominent to have been represented by their heads in gargoyles as fabled sources for rivers, and their figures on string-courses, friezes, and on door-mats, without direct or conscious connexion between one use and another. The *chakora* or bartavelle partridge—said to subsist on moonbeams—is equally frequent in such sculptures, if not more so.

Nor will the identification of the four quadrupeds with the four cardinal points satisfy Hindu canons of iconography. There are "eight quarters," and so we have the eight *diggajas*, or elephants of the eight points, and otherwise, the eight *dikpālas* or *dikpatis*—lords of the points. And if we did select from the latter those corresponding to our own four, we should have Indrā of the East on the elephant Airāvati; Yama of the South on a black buffalo; Varuna of the West on a stag; and Kuvera of the North in a chariot; and these vehicles do not agree with those on the *padmāśilas*.

Edinburgh.

9, Conduit Street, London, W., 10*th December* 1898.

CHRONICLE.

THE NOVEMBER EXAMINATIONS.

The results of the November Examinations, which were announced at the Meeting of Monday the 5th inst., are as follows:—

The Preliminary.

The Preliminary Examination, to qualify for registration as *Probationer R.I.B.A.*, was held in London, Birmingham, Bristol, Manchester, and York on the 8th and 9th ult. Of the 130 candidates, claims for exemption from sitting were allowed in the case of fifty-two. The remaining seventy-eight were examined, with the following results:—

	Passed	Relegated	Total
London	23	22	45
Birmingham	2	2	4
Bristol	6	1	7
Manchester	10	5	15
York	5	2	7
	46	32	78

The names of the successful candidates, including those exempted—making a total of ninety-eight—have been entered on the Register of Probationers, and are here printed in alphabetical order:—

AGUTTER: Edwin Albert; Falconhurst, Devonshire Road, Honor Oak Park, S.E. [*Master*: Mr. J. T. Lee *].

ALEXANDER: James Montgomerie; Greenbank, Ashton, Gourock, Scotland [*Master*: Mr. Jas. B. Stewart].

AMIES: Herbert William; The Vicarage, Barkworth Road, South Bermondsey, S.E. [*Masters*: Messrs. Truefitt & Watson *].

ANDERSON: Douglas; Aldersyde, Middleboro' Road, Coventry [*Master*: Mr. T. R. Donnelly].

ANDERSON: Herbert Cooper; Wesley Villa, Wesley Road, Leeds [*Masters*: Messrs. Thos. Howdill & C. B. Howdill *].

ARMOUR: John Laurence; 5, Woodhouse Terrace, Gateshead-upon-Tyne [*Master*: Mr. W. Lister Newcombe *].

ARTHUR: John Maurice; West Parkhill, Airdrie [*Master*: Mr. George Arthur].

BALDERSTONE: John Henry; 128, Railway Terrace, Padiham, Lancs. [*Master*: Mr. John Gregson].

BARKER: Walter Clement; West Grove, Hebden Bridge, Yorks [*Master*: Mr. Wm. H. Thorp *].

BATLEY: Claude: Little Roundwood, Ipswich [*Master*: Mr. George Wm. Leighton].

BENNETT: Robert; c/o Messrs. Parker & Unwin, The Quadrant, Buxton [*Masters*: Messrs. Parker & Unwin].

BLACKA: Fort Vincent; Victoria Villa, Todmorden [*Masters*: Messrs. Butterworth & Duncan].

BLADEN: Lionel Macdonald Wells; Fairlie, Stone, Staffs. [*Masters*: Messrs. Lynam, Beckett & Lynam].

BOSSOM: Alfred Charles; 17, Caledonian Road, King's Cross, N. [Polytechnic Architectural School].

BOWEN: Henry Farre; 102, Lansdowne Place, Brighton [Harrison College, Barbados].

BOX: Lawrence Ashton; 339, High Street, Cheltenham [*Masters*: Messrs. H. A. Prothero * & G. H. Phillott].

BOYLE: Joseph; Low Wood, 195, Chorley New Road, Bolton, Lancs. [*Master*: Mr. Robert Boyle].

BRAMLEY: Francis Herbert; Claremont Crescent, Sheffield [*Masters*: Messrs. Flockton,* Gibbs * & Flockton *].

BRIDGES: Sydney; 30, Wickham Road, St. John's, S.E. [*Master*: Mr. George Elkington *].

BUCKLEY: Harry Francis; South Field, Halifax [*Master*: Mr. Thos. Kershaw *].

CHAMBERS: Theodore Gervase; 4, Bloomsbury Place, W.C. [Tonbridge School].

CHARD: Claude Percy; Glen View, Wembdon, Bridgwater [*Masters*: Messrs. Samson * & Cottam *].

CHILWELL: Benjamin Charles; Oakeswell, Wednesbury [*Master*: Mr. C. W. Bosworth].

CHURCH: Guy; Sunny Bank, Warlingham, Surrey [*Master*: Mr. A. Beresford Pite *].

CLARKE: Herbert Ford; 56, Great Cheetham Street, Lower Broughton, Manchester.

CLAYPOLE: Edward Ernest Blunt; 2, Benedict Road, Brixton, S.W. [*Master*: Mr. Aston Webb *].

COLLINGS: John Saxby; 68, Jermyn Street, St. James's, S.W. [*Master*: Mr. J. Osborne Smith *].

COLLINGTON: Frederick Edwin; 42, Vicarage Street, Nottingham [*Masters*: Messrs. Sutton & Sutton].

COMMIN: Ethel May; Barnfield Road, Exeter [*Master*: Mr. Frederick J. Commin].

CORKING: James William; 42, Jackson Street, Gateshead [*Master*: Mr. James W. Frazer *].

COSWAY: Reginald Wentworth Alfred James; 6, Engineers' Quarters, H.M. Prison, Wandsworth [*Master*: Mr. T. E. Lidiard James *].

CRICKMER: Courtenay Melville; 15, Albert Road, Regent's Park, N.W. [*Master*: Mr. A. Aitchison *].

CURTIS: William Thomas; Harbledown, South Croxted Road, W. Dulwich [*Master*: Mr. Durward Brown].

DAVIDGE: William Robert; Teddington Park Road, Teddington, S.W. [*Master*: Mr. M. Hainsworth].

DAVIES: Alan Hier; Rosemont, Clytha Park, Newport, Mon. [*Masters*: Messrs. Habershon & Fawckner].

DYER: Frank; 167, Chorlton Road, Brooks's Bar, Manchester [*Masters*: Messrs. Booth & Chadwick *].

ELKINGTON: George Leonard; 95, Cannon Street, E.C. [*Master*: Mr. George Elkington *].

ELY: George Frederick; 32, King Street West, Manchester [*Master*: Mr. John Ely *].

FORBES: James; 2, Woodlands Terrace, Borough Road, Middlesbrough [*Masters*: Messrs. R. Lofthouse & Sons *].

FOURACRE: John Leighton; 16, Portland Square, Plymouth [*Master*: Mr. H. J. Snell].

GARDINER: Frank George; 7, and 8, Barton Street, Bath.

GASK: John Harold; Bank House, Todmorden [*Masters*: Messrs. Barker & Ellis].

GRADWELL: Arthur Rowland; Bank Villas, Blackburn [*Masters*; Messrs. Stones * & Gradwell].

GRANT: Robert; Dunheanish, Oban [*Master*: Mr. Alex. Shairp].

HALL: Amos George Frederick Martin; Huntly Grove, Peterborough [*Master*: Mr. Martin Hall].

HASWELL: Frederick; Monkseaton, Northumberland [*Master*: Mr. F. R. N. Haswell *].

HAWARD: Francis Robert Boyd; 19, Nelson Road South, Great Yarmouth [*Masters*: Messrs. Bottle * & Olley].

HEMINGWAY: Willie; 254, Ainsworth Lane, Tonge, Bolton [*Master*: Mr. Frank K. Thompson].

HILTON; Geoffrey William; Burlaston, Stoke-on-Trent [*Master*: Mr. G. L. Jones].

HOLBROOK: Arthur Ernest; Warleigh House, Grove Road South, Southsea [*Master*: Mr. Alfred H. Bone].

HOLDER: Archibald Lawrence; 5, Bloomsbury Square, W.C. [*Master*: Mr. W. West Neve].

HOSKINS: Henry Joseph Bissaker; 45, Longmore Street, Birmingham [*Masters*: Messrs. Cossins, Peacock & Bewlay].

HOSSACK: Ian Andrew; 123½, Union Street, Aberdeen, N.B. [*Master*: Mr. Arthur Clyne].

HUGGUP: Robert, jun.; Low Hedgeley, Glanton, Alnwick [*Master*: Mr. Geo. Reavell].

HUSSEY: Montague Grove; 13, Promenade, Cheltenham [*Masters*: Messrs. Prothero * & Phillott].

JUDGE: Max; 7, Pall Mall, S.W. [*Master*: Mr. Mark H. Judge *].

KELLETT-SMITH: Herbert Chippendale; Hill View, West Kirby, Cheshire [*Masters*: Messrs. Willink * & Thicknesse].

KENNEDY: William James; 8, Fettes Road, Edinburgh [*Masters*: Messrs. Hay & Henderson].

KNAPP: Alured Faunce Primatt; Forest School, Walthamstow].

LACEY: Philip Warner; Selwyn House, Mill Hill, Derby [*Masters*: Messrs. Naylor * & Sale].

LAYCOCK: Edward Penard; 5, Argyle Terrace, Plymouth [*Masters*: Messrs. King & Lister].

LEECH: Norman Austin; The Walnuts, Pinkney's Green, Maidenhead, Berkshire [King's College Architectural School].

LETHBRIDGE: James Morton; 9, Cholmeley Villas Highgate, N. [*Master*: Mr. George Lethbridge *].

McKISSACK: James; 68, West Regent Street, Glasgow [*Master*: Mr. John McKissack].

MARWICK: Thomas Craigie; 43, Lauder Road, Edinburgh [*Master*: Mr. T. P. Marwick *].

MILLAR: Allan Scott; 5, Victoria Square, Reading [*Masters*: Messrs. Millar & Nasmyth].

MOORE: John Kerruish; 20, Copeland Road, Walthamstow.

MOSS: Harry; 9, Park Road, Alexandra Park, Manchester [*Master*: Mr. F. W. Dixon].

NASH: William James; 117, Midland Road, Wellingboro', Northants [*Master*: Mr. Alfred Bucknall].

NEWMAN: Bernard Leigh; Ty-Melyn, Clytha Park, Newport, Mon. [*Masters*: Messrs. Habershon & Fawckner].

PARLETT: John; 33, Daneville Road, Denmark Hill, S.E. [*Masters*: Messrs. Colman & Thomas].

PAYNE: Ernest Henry; 95, Lincoln Street, Barton Hill, Bristol [*Masters*: Messrs. La Trobe * & Weston *].

PEASE: Charles Edward; Lancaster Lodge, Lawriston Road, Wimbledon, S.W. [*Masters*: Messrs. C. John Mann & Son].

PHIBBS: Harry; Williams Street, Brierley Hill, Staffs. [*Master*: Mr. R. S. Oldacre].

POULTER: Briant Alfred; Collingwood, Camberley, Surrey [Farnham Grammar School].

PREECE: John; 62, Miskin Street, Cathays, Cardiff [*Master*: Mr. David C. Salmond].

PRICE: Francis Henry; 8, Mount Terrace, Taunton [*Master*; Mr. C. H. Samson *].

RAINFORTH: Sydney Herbert; Brier Gate, South Park, Lincoln [*Masters*: Messrs. W. Watkins * & Son *].

RICHMOND: Wilfrid Stanley; 89, Victoria Road, Bedford [Bedford Modern School].

ROBINSON: Francis James; 39, Green Park, Bath [*Master*: Mr. Mowbray A. Green *].

SALVIN: Thomas; Melrose, Sheffield Road, Chesterfield [*Master*: Mr. Charles Hadfield *].

SCOTT: Archibald; 6, Broompark Terrace, Dennistoun, Glasgow [*Masters*: Messrs. Thos. Dykes and Andrew Robertson *].

SHEBBEARE: Henry Vivian, B.A. Cantab.; 1, The Crescent, Surbiton [*Master*: Mr. E. W. Mountford *].

SIMPSON: Claude Herbert; 19, Southbourne Road, Sheffield [*Masters*: Messrs. Flockton,* Gibbs * & Flockton *].

SMITH: John Barlow; 8, Kent Villas, Alexandra Place, Bedford [*Masters*: Messrs. C. E. Mallows & Grocock].

SMITH: William Collin; 1, Westbourne Park Crescent, Paddington, W. [Philological School, Marylebone Road].

SPENCER-SMITH: Charles Owen; Palmer Lodge, Palace Street, Westminster, S.W. [*Master*: Mr. H. Percy Adams *].

STAIR: Arthur Cecil; Highcroft, Etchingham Park, Church End, Finchley, N. [*Master*: Mr. Ernest A. E. Woodrow *].

STRETTON: Clement; 2, Mecklenburg Street, Leicester [*Master*: Mr. Stockdale Harrison *].

SULLIVAN: Leo Sylvester; 28, Maitland Park Villas, Haverstock Hill, N.W. [*Masters*: Messrs. Alfred Waterhouse * & Son *].

SYMON: Alexander; 7, John Street, Bedford Row [*Masters*: Messrs. Carver & Symon].

TOD: George Wallace; 19, East Preston Street, Edinburgh [*Masters*: Messrs. MacGibbon & Ross].

TOPLEY: Samuel Douglas; 57, Granville Park, Lewisham, S.E. [St. Dunstan's College, Catford].

TYNDALL: Richard John; 17, Castellain Road, Maida Vale, W. [*Master*: Mr. A. J. Style *].

WALTERS: Frederick George; 37, Great Queen Street, Westminster, S.W. [*Master*: Mr. F. A. Walters *].

WIDDUP: Percival Sylvester; 171, Preston New Road, Blackburn [*Master*: Mr. Walter Stirrup].

WILLIAMS: Geoffrey Hyde; Longwood Vicarage, Huddersfield [*Master*: Mr. J. William Cocking].

YORKE: John Vincent; Church Street, Tunstall, Staffs. [*Masters*: Messrs. Wood & Hutchings *].

The asterisk (*) denotes members of the Institute.

The Intermediate.

The Intermediate Examination, to qualify for registration as *Student R.I.B.A.*, was held in London, Bristol, Manchester, and York, on the 8th, 9th, 10th, and 11th ult. The results were as follows:—

	Passed	Relegated	Total
London	27	9	36
Bristol	—	1	1
Manchester	2	2	4
York	3	4	7
	32	16	48

The successful candidates have been registered as *Students R.I.B.A.*, and their names, placed by the Board of Examiners in order of merit, here follow:—

BYRNE: Thomas Joseph [*Probationer* 1897]; 55, Clarence Street, Kingston-on-Thames [*Master*: Mr. F. R. Farrow *].

EWING: James [*Probationer* 1897]; 70, Church Street, Berwick-upon-Tweed [*Masters*: Messrs. James Stevenson & Son].

GREEN: Thomas Frank [*Probationer* 1893]; 55, Blenheim Terrace, St. John's Wood, N.W. [*Master*: Mr. Frederick Wheeler *].

PAPWORTH: Alfred Wyatt [*Probationer* 1897]; 8, Maitland Park Road, N.W. [*Master*: Mr. Arthur Cates *].

HOLSTEAD: Abraham [*Probationer* 1897]; 46, Hopwood Lane, Halifax, Yorks. [*Master*: Mr. Petty].

MAYHEW: Robert Henry Jewers [*Probationer* 1897]; Edmondsbury, Genoa Road, Anerley, S.E. [*Masters*: Messrs. Roger Smith * & Son *].

GOULD: Victor Royle [*Probationer* 1898]; 10, Hamilton Road, Highbury, N. [*Master*: Mr. A. W. Hennings *].

MACKENZIE: Alexander George Robertson [*Probationer* 1894]; 61, Queen's Road, Aberdeen [*Master*: Mr. A. M. Mackenzie,* A.R.S.A.].

WILSON: Henry Armstrong [*Probationer* 1896]; 20, Broughton Road, South Shields [*Master*: Mr. C. S. Errington *].

HEMINGWAY: Ralph Eustace [*Probationer* 1896]; 1, Brunel Terrace, Derby Road, Nottingham [*Master*: Mr. A. N. Bromley *].

REILLY, Charles Herbert, B.A. Cantab. [*Probationer* 1896]; 23, St. Swithin's Lane, E.C. [*Master*: Mr. Charles Reilly *].

SPAIN: John Edward [*Probationer* 1897]; The Rectory, Rand, Wragby, Lincolnshire [*Master*: Mr. Wm. Scorer *].

COCKRILL: Ralph Scott [*Probationer* 1896]; Northbury, Great Yarmouth [*Master*: Mr. J. W. Cockrill *].

WRINCH: Raymond Cyril [*Probationer* 1896]; Hill Crest, Ipswich [*Master*: Mr. E. F. Bishopp].

TREW: William George [*Probationer* 1897]; Tanglin, 232, Dulwich Rise, S.E. [*Masters*: Messrs. H. S. Legg * & Son *].

BAIRD: James [*Probationer* 1894]; Clyde Villa, Prestwick, Ayrshire, N.B. [*Master*: Mr. D. V. Wyllie].

WALKER: George [*Probationer* 1897]; Clyde Villa, Old Newbarns, Barrow-in-Furness [*Master*: Mr. John Butler].

GRACE: Lionel Upperton [*Probationer* 1897]; c/o R. C. Edwards, Esq., 37, Norfolk Street, Strand [*Master*: Mr. R. Clarke Edwards *].

NORMAN: George Henry [*Probationer* 1896]; 24, Palm Street, Old Ford [*Master*: Mr. J. Henry Ball *].

SMITH: Spencer [*Probationer* 1896]; 29, Lawson Road, Sheffield [*Master*: Mr. A. F. Watson *].

BANFIELD: Ernest William [*Probationer* 1894]; 15, Penford Street, Knatchbull Road, Camberwell, S.E. [*Master*: Mr. H. L. Florence *].

BRESSEY: Charles Herbert [*Probationer* 1896]; 70–71, Bishopsgate Street Within, E.C. [*Master*: Mr. J. T. Bressey *].

CLIFTON: Leonard Winton [*Probationer* 1896]; Atherfield, Clifton Road, Winchester [*Master*: Mr. T. Stopher].

HUGHES: Augustus Edward, jun. [*Probationer* 1894]; 28, Mortimer Street, Regent Street, W. [*Master*: Mr. A. E. Hughes *].

HUNTER: James Douglas [*Probationer* 1895]; 10, Pemberton Gardens, St. John's Park, N. [*Master*: Mr. F. Hammond *].

JOSEPH: Charles Sampson [*Probationer* 1892]; 34, Inverness Terrace, W. [*Masters*: Messrs. Josephs * & Smithem *].

MILBURN: William Godfrey [*Probationer* 1896]; Hollywood House, Wimbledon Park, S.W. [*Master*: Mr. A. J. Gale *].

PICKERING: Arthur Edwin [*Probationer* 1893]; 70, Tressillian Road, Brockley, S.E. [*Master*: Mr. F. Nesbitt Kemp *].

PULLAR: Edgar John [*Probationer* 1894]; 111, Denmark Hill, S.E. [*Master*: Mr. Arthur Green *].

SMITH: Francis Danby [*Probationer* 1894]; Saxonhurst, Laurie Park Road, Sydenham, S.E. [*Master*: Mr. F. J. Smith *].

TASKER: Andrew Kerr [*Probationer* 1894]; Dunblane House, North Shields [*Master*: Mr. W. Hope].

WHITE: Horace [*Probationer* 1896]; Ellesmere, Loughton, Essex [*Master*: Mr. Edmond Egan *].

The asterisk (*) denotes members of the Institute.

The Final.

The Final and Special Examination was held in London from the 18th to the 25th ult. There were thirty-three candidates, of whom sixteen passed, the remaining seventeen being relegated to their studies. The successful candidates, who, subject to Section 8 of the Charter, have become qualified for Candidature as Associate, are as follows:—

BOURNE: Walter Hargreaves [*Probationer* 1895, *Student* 1897]; 29, West End Lane, West Hampstead, N.W.

CUBBON: John [*Probationer* 1892, *Student* 1894]; 2, Cambridge Road, Sale, near Manchester.

GREEN: Leslie William [*Probationer* 1891, *Student* 1897]; Sumptermead, Datchet, Bucks.

HIORNS: Frederick Robert [*Probationer* 1895, *Student* 1896]; 2, Moselle Villas, St. Peter's Road, Margate.

KIRKLAND: John [*Probationer* 1889, *Student* 1892]; 6, Aldebert Terrace, Albert Square, S.W.

KNIGHT: Edward Frost [*Probationer* 1896, *Student* 1897]; North Bank, Oakleigh Park, N.

MAGER: Ernest Jesse [*Probationer* 1894, *Student* 1895]; 28, Carlton Road, Tufnell Park, N.

PEARSON: Harry Dighton [*Probationer* 1890, *Student* 1891]; St. Arvan's, Teddington.

PHILLIPS: John Henry Arthur [*Probationer* 1894, *Student* 1896], 110, Cheapside, E.C.

REAVELL: George, jun.; Alnwick.

SCOTT: William Alphonsus [*Probationer* 1889, *Student* 1895]; 16, William Street, Drogheda.

STEADMAN: Vincent [*Probationer* 1892, *Student* 1894]; Gifford House, Alma Road, Clifton, Bristol.

TANNER: Henry, jun. [*Probationer* 1895, *Student* 1896]; Rothbury, Brackley Road, Beckenham.

TRIGGS: Harry Inigo [*Probationer* 1892, *Student* 1898]; Stafford House, Chiswick, W.

WAGER: Jasper; 2, Vanbrugh Hill, Blackheath, S.E.

WATSON: Arthur Maryon, B.A. Lond. [*Probationer* 1889, *Student* 1894]; 9, Nottingham Place, W.

The number of failures in each subject of the Final Examination was as follows:—

I.	Design	15
II.	Mouldings and Ornament . .	9
III.	Building Materials . . .	3
IV.	Principles of Hygiene . . .	5
V.	Specifications	2
VI.	Construction, *Foundations &c.* .	1
VII.	„ *Iron and Steel &c.* .	4

Prizes for Testimonies of Study.

The Cates Prize, value £10 10*s*., which is presented by Mr. Arthur Cates [*F.*] at every Final Examination, has been awarded to Mr. Harry Inigo Triggs for the best set of testimonies of study and supplementary drawings submitted for the November Examination.

The Council, on the recommendation of the Board of Examiners, have awarded the sum of £5 from the Ashpitel Fund to Mr. Henry Tanner, junior, for the creditable drawings submitted for the same examination.

The Admission of Lady Associates.

The candidature of Miss Charles for the Associateship gave rise to a long discussion at the Meeting last Monday. Clause 4 of the Charter, which the Council relied upon in support of the nomination, and which the Secretary was called upon to read to the Meeting, provides that "Associates shall be persons engaged in the study or practice of architecture who have attained the age of twenty-one years. From the date of this our Charter every person desiring to be admitted an Associate shall be required to pass or have passed such examination or examinations as may be directed by the Royal Institute." The following is an abstract of the discussion:—

Mr. DOUGLASS J. MATHEWS [*F.*] moved that the election of Miss Charles be not proceeded with until the members had had an opportunity of expressing their opinions as to the desirability or otherwise of admitting ladies to membership of the Institute. The matter came before members in a very awkward way at the present time. They must either admit the lady who was nominated, or object to her admission. It was not fair to members that they should be put to such an alternative. The nomination of a lady to membership of the Institute was such an absolutely new departure that it was only right that every member should have an opportunity of saying whether he approved of it or not.

Mr. DELISSA JOSEPH [*F.*] seconded the resolution. He was entirely in favour of the admission of ladies; but such an absolutely new departure from precedent should have been referred to more specifically in the Institute Journal, and opportunity given to members to discuss the principle before voting on any particular name. The name appeared in the list in the ordinary way, and escaped the notice of many members till Mr. Nash drew attention to it. He felt very strongly, with Mr. Mathews, that members should have the opportunity of discussing the principle before voting.

The HON. SECRETARY explained that, before Miss Charles was admitted to the Preliminary Examination, the Council were asked whether there was anything in the Charter or By-laws to prevent her coming up for election provided she passed the examinations. The Council replied in the negative. If they were to exclude ladies he considered they would be going against the Charter.

Mr. HENRY DAWSON contended that the Council had no right to take upon themselves to say that it was not contrary to the Charter or the By-laws. In his opinion it was distinctly contrary to the Charter and By-laws, and members had a reasonable ground of complaint that the Council should have taken this most extraordinary departure from the previous action of the Institute. The members ought not to have been put in the position they now found themselves. The Council should have consulted the General Body. The interpretation of the Charter was not for the Council but for the Institute to determine. Clause 2, referring to classes of members, distinctly stated that they should be as "hereafter established by the

Institute," not "by the Council." He should give notice that at the next Meeting he would move a resolution that the Council be requested to obtain the written opinion of an eminent counsel as to whether, under the terms of the Charter, ladies were eligible for election as Associates or Fellows, and that the Council call a General Meeting of members to report that opinion in order that the matter might be dealt with not by the Council but by the General Body.

Mr. W. HILTON NASH [*F.*] said that when the lady was put up for candidature he sent in a paper signed by himself and six other members, five being Fellows. The paper was as follows: "That we, the undersigned, having heard that it is proposed to nominate Miss Charles as an Associate of the Royal Institute of British Architects, wish to express our opinion that it would be prejudicial to the interests of the Institute to elect a lady member; and we therefore beg to give notice to the Council that it is our intention to oppose such nomination, as we consider the election of a lady member should be fully discussed." They had a right to have the matter discussed before the election took place, and that could be done without the breaking of any pledge to Miss Charles. He had no personal objection to the election of ladies; but this was a question of principle and precedent, and when an Institute with two Royal Charters went against precedent, it was doing a very dangerous thing. It would be remembered that though at the Universities of Oxford and Cambridge ladies were allowed to sit for the examinations, they were not given a degree. The Colleges of Physicians and Surgeons permitted ladies to sit for the examinations, but they conferred no degree. He contended that if they admitted this lady as an Associate they conferred a degree; they were going against the general principle of all institutions and associations of this kind. The junior Association had declined to admit this lady as a member of their body, and if the Senior Institute elected her they would have to alter the Charter and By-laws. He was willing to bow to the opinion of counsel who might be consulted on the matter, but the question should be fully discussed. The reason he had not pressed for a poll to be taken was because some members of the Council asked him not to oppose the election, and so the protest in the paper he had referred to was not followed up.

Mr. ROBERT WILLIAMS [*F.*] said that the Institute was established for the advancement of architecture. That was the main gist of the Charter. The Institute, therefore, should not stultify itself by refusing to elect this lady, who had passed all the qualifying tests. The census of 1891 showed that there were twelve ladies practising architecture in London alone, besides others in large towns, and since that time, no doubt, the numbers had been considerably increased. It would be well to honour the first lady candidate by electing her first—by placing her name before all the others. Therefore, seeing that the lady had fully qualified herself, he would propose that she be forthwith elected.

Mr. H. HEATHCOTE STATHAM [*F.*] pointed out that the new departure was not with the Council at all. The Council might have elected a lady member any time these 50 years. The new departure was that for the first time a lady had had the spirit and ability to go through the examinations. With regard to the remark about doing injury to the Institute, if they brought this matter to a meeting to be discussed, and tried to oppose it, they would be doing the Institute the greatest injury and be making it a subject of laughter. Considering the general public feeling now, it would seem that the profession should be open to women, and it would be the greatest possible mistake for the Institute to oppose the election.

Mr. DOUGLASS MATHEWS repudiated any personal feeling against the candidate, and it was on that account that he asked that the resolution might be put, and the election be postponed for the time being. Every member should have an opportunity of saying yes or no upon the point.

The PRESIDENT observed that there was no question of a new principle involved. The candidate had passed the examinations, and everything had been done according to rule. Her election could not be set aside because some members thought it undesirable to elect her. It was evident, as all the learned bodies were admitting ladies, that the Institute would be very much behind the age if it refused to elect them.

Mr. JOHN SLATER [*F.*], with regard to Mr. Dawson's remark that he knew nothing about the candidate having been allowed to enter for the examinations, pointed out that Miss Charles's name was announced in the Meeting-room and published in the Journal as having passed the Preliminary and Intermediate examinations; therefore it must have been known that she intended entering for the Final examination, and there was ample time to have opposed it.

Mr. DAWSON objected that the Council ought not to have admitted the candidate to examination without consulting the general body.

Mr. E. W. HUDSON [*A.*] thought it a matter for counsel to advise upon.

It was finally ruled that the election must proceed, and each candidate be voted on separately, with the result recorded in the Minutes.

Mr. DAWSON said he should put his notice of motion in writing, and send it to the Secretary.

The late Joseph Gibbons Sankey [*F.*].

Mr. Beresford Pite [*F.*] has kindly contributed the following obituary notice:—

Mr. Joseph Gibbons Sankey, M.A., whose decease on the 1st inst. has been announced, first became known in the London Architectural Association in 1879, having come to town after serving his articles in Manchester, and entered the offices of Mr. R. W. Edis. His work in the Class of Design, and later in the Royal Academy School, is ever remembered by fellow-students as rapid and effective in style, with a certain brilliancy and crispness in draughtsmanship that proved infectious. In a continuous succession Sankey obtained the A.A. Travelling studentship, the Sharpe prize, and the Pugin travelling studentship, and produced during his tours a set of pencil-drawings and sketches marked with a strong workmanlike quality and piquant touch. The piquancy of line and style of lettering became popular, and spreading through the hands of his friends Messrs. W. H. Bidlake and G. G. Wallace, affected a whole generation of student sketchers. About 1885 Sankey left Mr. Edis, and entered himself at Christ College, Cambridge, of which college his friend Bidlake had previously been a member, read "Natural Science," and obtained his B.A. and M.A. degrees in due course. The beginnings of his Manchester practice came upon him at Cambridge as he went down for a term or so to commence the erection of the Simpson Memorial Hall at Blackley, quantity surveying having formed a probably unrecognised but practically useful part of his college reading—as to this he said that he read the current work on the subject and measured, abstracted, and billed the whole "job" twice over, and had the reward for his pains of seeing it "work out" and "settle up" most satisfactorily. A short but rapid career of successful practice ensued during nine years, commencing with small premises and "bread-and-butter" jobs up to such large and important works as the additions to the School of Art for the Corporation, the new Mercantile Bank, and the mammoth warehouse of Messrs. Tootal, Broadhurst & Lee.

Mr. Sankey's draughtsmanship and rapid power in design and sense of effective colour stood him in effective stead in the creation by his own efforts during nine short years of a large practice, while his energy and capacity in affairs and clear straightforwardness of character made personal friends of his increasing circle of clients and business acquaintances, which was in evidence at his interment on Monday last in the Southern Cemetery at Manchester. Mr. Sankey died on December 1st after a week's illness, at Disley, Cheshire, at the early age of thirty-eight.

Building Requirements of the Future.

The Presidential Address delivered by Mr. F. W. Rich [*F.*] at the opening of the Session of the Northern Architectural Association touches on matters of special interest to architects at the present moment. Speaking of "Fireproof Buildings," Mr. Rich says:—

As a fireproof building has never yet been built, it is more correct to say a "fire-resisting" building, precisely in the same way as iron or steel safes have changed their names of late. This is a class of building needing all the skill of skilful men to devise—needing all our powers of observation and investigation to enable us to keep in touch with the times. It is what may be called the "Modern Building." . . .

There is often too much theory in the design of fire-resisting buildings. Fire is a terrible master, but, in it, Dame Nature will have her way; it is therefore no use romancing in matters of construction. It is now pretty well agreed that all important or business premises, especially those abutting on public thoroughfares, should be reasonably fire-resisting, yet we frequently find them supported on the ground floor entirely on cast-iron columns or steel stanchions. The effect of this, in the event of a fire, is for the whole building to collapse like a pack of cards.

It may be said architects are to blame for this, but it is not so. From what I know of architects, I do not think there is one who, in designing a building, would, on his own intuitive knowledge of design, ever produce a building standing apparently on plate glass.

This iron and plate glass is one of the signs of the times, one of the phases in the history of architecture of the nineteenth century. The busy City man, in his instructions to his architect, insists on having "all window," and he has to have it. Therefore that material which will bear the greatest load on the smallest section must be used for supports, and, for the rest, glass, for which there is no substitute. But, unfortunately, both these substances are not safe under fire. Here, however, is where the skill of the architect most come in, and here we must rely on our actual experience in fires, noting the effect on building materials, and on well-conducted and authentic experiments. I think further that, at this time, it is peculiarly opportune to refer to fire-resisting buildings, for our methods of construction are altering every day, and, if they are so altering, they may as well alter in the direction of safety. Science has yet a big field before it; there are already many materials in the market of which we can take advantage in constructing fire-resisting buildings, but more efficacious ones are needed.

Everyone who has noted the great change that has come over building material during the last twenty-five years, and of the wants of the general public, cannot, I believe, help coming to the conclusion that sooner or later some of our well-known and much used materials—such, for instance, as wood and common lime plastering—will become more scarce, and may, to a great extent, drop out altogether. Already other materials are taking their place.

Wood has two great faults (though I am bound to say it has many virtues): it is highly inflammable, and it is highly susceptible to wet and heat. Schemes have been tried with a view to render wood less inflammable, but before we can consider our buildings fire-resisting, much more must be done in that direction—that is to say, if wood is used.

It is in the "rush of business" that wood fails us. Our clients will not wait, they must have their buildings finished quickly, and expect them to be quite dry in no time, forgetting that the materials of which they are built are largely mixed with water. . . . The wood fittings are fixed while the building is reeking with moisture, and when, having had time to imbibe a quantity of this moisture, which expands the fibres of the wood, the heating apparatus is then lighted up, and the woodwork shrinks often to a wreck.

It is quite clear that under these circumstances neither of these materials (wood and lime plaster) meets the demands of ordinary practice — wood on account of its inflammable nature and instability, and lime plaster on account of its wetness and slow setting. There are many excellent quick-setting plasters in the market, but we frequently lay this on to wooden laths, which in their turn are upheld by wooden stoothings. In case of a conflagration all this ends in disastrous results. Indeed, we may go further, and say a great many of the usual modes of construction are wrong, for do we not embed floor, roof, and other timbers in the walls, where they rot, and do we not form cavities between floors and ceilings, hollow partitions, skirtings, &c., which form excellent channels for fire? Much of this can be avoided by using a more solid form of construction, but this means more cost: it is the difference between good work and jerry work. The public, after all, have it very much in their own hands to decide. I think all buildings should be built reasonably fire-resisting, especially public buildings, business premises, and country mansions. There seems to have never been a public building so reasonably fire-resisting as the Colosseum of old Rome, and although such a building is unlikely to be built in this age, yet its lessons should not be lost upon us. A building of to-day would be more composite in its materials . . . but simplicity in materials, as in details, is often the secret of good design. . . .

It is time, therefore, that more attention was given to fire-resisting buildings, even in a small way; and if wood is still to be used, it must be rendered entirely non-inflammable, and the process must not much increase its market value or render it unworkable on the bench; or, if wood cannot be so treated, then some other material is wanted to fill up the missing link—some material that will be easily worked into all the varied uses to which we now put wood, such as our doors, windows, staircases, and innumerable other things. It must not only be non-inflammable, but must be of such a nature as will admit of its being worked into all the uses I have indicated; and also to be adaptable to all the alterations that occur in ordinary life, such as the alteration of buildings, or even the alteration of a door, or a window, or making a new way through a partition, &c. Wood lends itself easily to all these alterations. It is owing to this very word "alterations" that so many schemes now in the market for fire-resisting purposes fail. But that fatal word "alterations" must be reckoned with; for although the quality of being fire-resisting is a very important question, yet it must go hand in hand with ordinary usefulness, for buildings change owners, and often uses, and alterations become inevitable.

The new material, if indeed we are to have one, must have a further quality beyond being fire-resisting: it must be proof against all influences, as to wetness or dryness; it must not shrink when the fires are lighted, or swell in a damp building, for, as I have said before, men will not wait nowadays for natural materials to season.

With regard to tests of materials, Mr. Rich says:

The scope of this subject is endless, as all experimenters know. It is too vast a subject to be undertaken by a private individual, and no government will undertake it. How, then, can this thorough, far-reaching, and absolutely authentic series of experiments be carried into execution?

There have been no thorough series of experiments for architects on materials in purely architectural construction. The Institute has lately carried out some experiments as to the strength of brickwork, &c., which are most valuable; but I do not think the expense of the system I am now foreshadowing should fall on only a part of the members of our profession—I think a much greater grasp should be taken of the situation. All our building materials, as used in the ordinary building manner, should be subjected to exhaustive tests of every kind, not only with regard to strength or endurance, but also to that "fire resistance" to which I have before alluded. I do not mean that every piece of brick, stone, concrete, wood, or iron should be tested, but sufficient experiments be carried out to establish a reliable data. . . .

I am not going to say who is going to move first in this matter, or to say how it is to be brought about. I shall leave that to the collective wisdom of the members of our profession. All I would suggest is that, in such a scheme, the control should be in the hands of the Institute, and all members of the profession, whether members of the Institute or not, all members worth the name, should contribute in annual subscriptions in such a sum as to make it worth while for the best men giving us the benefit of their services.

MINUTES. III.

At the Third General Meeting (Business and Ordinary) of the Session, held Monday, 5th December 1898, at 8 P.M., the President, Professor Aitchison, R.A., in the chair, with 42 Fellows (including 15 members of the Council), 56 Associates (including 1 member of the Council), 1 Hon. Associate, and several visitors, the Minutes of the Meeting held 21st November 1898 [p. 48] were taken as read, and signed as correct.

The Hon. Secretary announced the decease of Sir John Fowler, K.C.M.G., *Hon. Associate*, elected 1877, and of Joseph Gibbons Sankey (Manchester), *Fellow*, elected 1897.

The Secretary announced the results of the November Examinations, and read the names of those who had passed and of winners of the Cates Prize and of an additional prize for testimonies of study.

The following candidates for membership in the various classes were elected by show of hands:—

As Fellows (4).

ROBERT LOCKHART McCOWAT (Johannesburg).

WILLIAM WHITE COOPER, M.A. Cantab. (Cape Colony).

HENRY THOMAS HARE [*A.*], *Ashpitel Prizeman* 1886.

WILLIAM HENRY DUFFIELD [*A.*]

As Associates (14).

JOHN CECIL BAINES [*Probationer* 1894, *Student* 1896, *Qualified* 1898], Leicester.

CHRISTOPHER WILLIAM SURREY [*Probationer* 1891, *Student* 1894, *Qualified* 1898].

ALBERT HERBERT [*Probationer* 1893, *Student* 1894, *Qualified* 1898, *Cates Prizeman June* 1898] (Leicester).

LOUIS MOORE [*Probationer* 1893, *Student* 1895, *Qualified* 1898] (Southampton).

PERCIVAL CHERRY BLOW [*Probationer* 1890, *Student* 1894, *Qualified* 1898] (St. Albans).

JAMES STOCKDALE HARRISON [*Probationer* 1892, *Student* 1895, *Qualified* 1898] (Leicester).

ETHEL MARY CHARLES [*Probationer* 1893, *Student* 1895, *Qualified* 1898].

ARTHUR REUTLINGER GOUGH [*Probationer* 1891, *Student* 1895, *Qualified* 1898] (Bristol).

CHARLES RIDDEY [*Probationer* 1894, *Student* 1896, *Qualified* 1898] (Wellingborough).

VICTOR EVANS BÖSHER [*Probationer* 1892, *Student* 1895, *Qualified* 1898] (St. Leonard's-on-Sea).

ROBERT WALTER CARDEN [*Probationer* 1893, *Student* 1896, *Qualified* 1898].

ARTHUR WILLIAM VERCOE [*Probationer* 1891, *Student* 1892, *Qualified* 1898].

ALEXANDER COWIE [*Probationer* 1894, *Student* 1896, *Qualified* 1898].

GERALD McMICHAEL [*Probationer* 1892, *Student* 1895, *Qualified* 1898] (Birmingham).

As Hon. Associate.

SIR ALEXANDER BINNIE.

Prior to the election of the Associates, objection was taken by various members to the candidature of Miss Charles, it being urged that the Council had acted *ultra vires* in admitting a lady to the qualifying tests, that the admission of lady members was contrary to the Charter, that counsel's opinion be obtained thereon, and that the election of Miss Charles be stayed until the Institute had had an opportunity of discussing the question. It was ultimately ruled that the election must proceed, and each name was voted upon individually, with the result that the candidates—with the exception of Miss Charles—were elected unanimously, and Miss Charles by a majority of 35—51 voting for, and 16 against the election.

A Paper by Mr. R. W. Gibson (New York), entitled FIREPROOF CONSTRUCTION OF BUILDINGS IN AMERICA, having been read by Mr. H. D. Searles-Wood [*F.*], Hon. Secretary of the Science Standing Committee, a large number of lantern views illustrative of the subject were shown, and explained by Mr. Searles-Wood. A discussion ensued, and a very cordial vote of thanks passed to Mr. Gibson for his Paper and the illustrations which accompanied it. Votes of thanks were also passed to the editor of *Engineering* for permitting the reproduction for the purposes of the Meeting of a series of illustrations which had appeared in *Engineering*, and to Mr. Searles-Wood and other members of the Science Committee for their work in connection with the Paper.

The proceedings then closed, and the Meeting separated at 10.30 P.M.

TWO PAPERS ON ELECTRICITY.

By Bernard M. Drake, M.I.E.E., and H. R. J. Burstall, M.Inst.C.E.

Read before the Royal Institute of British Architects, 19th December 1898.

I.- SOME PRACTICAL HINTS ON THE PRODUCTION AND USE OF ELECTRICITY FOR LIGHTING COUNTRY HOUSES.

By Bernard M. Drake, M.I.E.E.

THE electric light is no longer the light of the future; it is essentially the light of the present, and has come to stay. Only a few years back its use in a country house was regarded as a curiosity; now, the redolent oil lamp and guttering candle have been laid aside with the high-wheeled bicycle and other relics of bygone days. Thus to the multifarious knowledge of the architect must now be added a grasp of the "practics" of electric lighting and its attendant paraphernalia.

Fortunately the development of the industry has brought with it simplification, and whereas it was usual to cover a wall with switchboards, the functions of which were regarded as a trade secret to be imparted only to the initiated, now it is found possible to meet all practical requirements with three or four switches, which any gardener can learn in an hour to manipulate. Any amateur can elaborate, but the work of a genius will be stamped by its simplicity.

It is manifestly impossible in a short Paper to do more than skim this intricate subject, and the writer has tried to confine himself to the practical points which crop up daily in an architect's office, and are searched for in vain amongst the miscellaneous text-books on electric lighting at his disposal. It has been remarked with some truth that those who know are too busy to write books, and those who fail to make a success of their own business are ever ready to turn to the instruction of others as a means of livelihood; certainly with regard to electric lighting this applies in more ways than one.

In the following remarks it is assumed that the superiority of electric lighting is now so well proved that no attempt is necessary to make the most of its advantages, or to conceal the pitfalls into which the unwary may stumble. In discussing the matter with architects, the writer feels that to make his Paper of practical use he must state frankly the *pros* and *cons* of the different courses open, even at the risk of conveying the impression that the system is not altogether without its drawbacks.

The first question that naturally occurs in lighting a country house is the provision to be made for the generating plant, and where it shall be put. This brings us to a consideration of the different developed methods at our disposal, which are briefly as follows:—1. Steam

Engine; 2. Petroleum Engine; 3. Gas Engine; 4. Water-wheel or Turbine; 5. Wind Engine; 6. Primary Battery. The advantages and disadvantages of each may be summed up as follows:—

1. STEAM ENGINE.

Advantages.—Is more developed than any other, and being made in larger quantities is better value. More understood by local engineers, and therefore more easily repaired; yields a steady light free from pulsations; has a storage in the boiler, and is therefore less liable to sudden stoppage.

The two principal classes of steam plants are—(1) The Cornish or Lancashire separate boiler, requiring a chimney (preferably of brick), which supplies steam to an independent engine; (2) The so-called semi-portable self-contained engine and boiler. The former is by far the most durable, and should be used where hard work is expected or the water produces incrustation. The engine and dynamo may be coupled direct, but for country-house work the belt is a safeguard, for it is thrown off in case of faulty manipulation, and the dynamo saved rom damage. The semi-portable occupies less space, and saves considerably in builder's work; it may be advantageously put down where the house will only be occupied for part of the year, provided a supply of soft water is available.

Disadvantages.—A steam engine requires careful stoking, or it will make smoke; it takes half an hour to get up steam, and uses a considerable amount of coal before the run commences; the attendant cannot safely leave it while at work, and it uses three gallons of water per horse-power per hour, which must be specially treated if it is likely to produce scaling in the boiler. There is possible risk of explosion if the water is allowed to run low, and it requires considerable outlay in building and foundations.

2. PETROLEUM ENGINE.

Advantages.—Requires the attendant only at starting and stopping, with occasional visits to inspect bearings. . Cartage from the nearest station is only one-sixth the weight of the coal that would be required for the same output. Requires little outlay for foundations and builder's work. Risk of explosion practically *nil* if carefully arranged. Only a small quantity of water is required for cooling the cylinder.

Disadvantages.—Smell of the exhaust, which will travel 200 yards if allowed to escape from a hot iron pipe as sent out by most of the makers, though it can be rendered imperceptible at fifty yards if properly treated. The same applies to noise of exhaust. Engine requires an expert if it becomes deranged; petroleum is liable to market fluctuations; the light is subject to pulsation unless sufficient fly-wheels are provided. Being dependent on a separate explosion for each movement of the piston, it is more liable to sudden stoppage than a steam engine. The fire insurance companies require special arrangements to be made for the storing of petroleum.

3. GAS ENGINE.

Advantages.—Requires less attention than steam or petroleum, and less cleaning after work. Is more perfected than the petroleum engine, and cheaper in first cost. More easily repaired, and less likely to get out of order. No cartage of fuel required or trouble of ordering coal or petroleum. Small outlay for builder's work. Can be started in a few minutes.

Disadvantages.—Noise of exhaust if not properly treated. Gives a pulsating light unless sufficient fly-wheels are fitted. Requires gas supply to be regular and of even pressure, Risk of gas supply being intercepted by frost. Is dependent on each explosion for continuity of action.

4. WATER TURBINE, OR WHEEL.

Advantages.—Where a good head of water is available it is undoubtedly the best source of power, requiring the minimum of attention, capable of being started immediately, yielding a light free from pulsation, and wearing better than any of the preceding engines. Even where there is no large fall at any one place, it is frequently possible to dam up the course of the stream and carry a pipe to a lower position, where the turbine may be placed. As the charging only occupies a few hours a day, it is often possible to bring into use discarded mills which were abandoned as being incapable of providing continuous power; it is also practicable to utilise a stream which in itself would give only a fraction of the necessary power by allowing it to accumulate during the twenty-four hours.

Disadvantages.—Extra first cost due to earth work, especially with low falls. Risk of stoppage from severe frost. In comparing water-power with engines, the interest on additional first cost must be balanced against the coal bill saved.

5. WIND ENGINE.

Can only be recommended as an auxiliary in regular practice, the cost of accumulators necessary to tide over a long period of stillness being far greater than that of an auxiliary engine, apart from the fact that an accumulator cannot be kept in order with a small charging current.

6. PRIMARY BATTERY.

The direct production of electricity without engine and dynamos may be accomplished some day on a practical basis, but so far the attempts have proved far more costly than engines and dynamos, and have required too much attendance. Most of these have used either zinc or iron, and carbon with nitric and sulphuric acid, and have been discarded owing to the nitrous fumes produced, the difficulty of keeping the cells in order, and the rapid depreciation. Later modifications are stated to be an improvement in details, though the outlines appear to be the same. Owing to the high resistance and polarisation or production of bubbles on the surface of the plates, there will always be difficulty in maintaining the voltage constant, unless the primary battery is merely used to charge an accumulator.

It will be seen from the above that each case requires an individual study of the local conditions and working requirements before deciding what will be best, and it is not a matter which can be safely left to the decorator or hot-water engineer to diagnose. The writer has frequently found that a combination of gas and petroleum, or turbine and steam engine, gives the best results.

DYNAMO.

From whatever source the power is obtained, the dynamo for ordinary requirements is the same, except that it will be required to be fitted with a fly-wheel for use with petroleum and slow speed gas engines, provided the engine has to be run while the lights are used. Where only required for charging the accumulators, this may be omitted, as it wastes a certain amount of power.

The most important features in the dynamo for country house lighting are:

1. *Absence of Sparking.*—Sparking will wear out both brushes and commutator.
2. *Perfect Balance of the Armature or Revolving Portion of Machine.*—Vibration (which

can be detected by placing the hand on the frame) is one of the causes of what are known as flats on the commutator. It is useless to try and bolt down a badly balanced machine, for the trouble will only recur at intervals when the bolts have shaken loose.

3. *Strong Shaft and Wide Bearings.*—Unless the shaft is very strong and the bearings wide, there will be trouble from hot bearings, for the strain produced by the magnets when the metal begins to wear is very great.

4. *Good Automatic Lubrication.*—The best form of lubricator is a loose ring revolving in an oil bath. This avoids any risk of the bearing being damaged owing to the attendant having forgotten to fill the lubricators, for by this system the oil only requires renewal after long intervals.

5. *Absence of Heating.*—Undue heating of the armature and magnets, say 70 degrees above that of the engine room, means unnecessary loss of efficiency.

Accumulator.

This may be taken as a necessity in every country house installation, and the position of the room for its accommodation will require careful consideration. For reasonable distances up to 150 yards the engine and accumulator rooms should be placed alongside each other, as the attendant can see that each cell charges up equally, which is essential to success. He can also switch down the discharge regulating switch, and thus keep the voltage on the lamps regular while the engine is running. On the other hand, there is more loss of brilliancy in the lights as the full number are switched on, than would take place if the cells were put in, or close to, the main building.

Where the current is brought from a distance, or the light will always be supplied from the accumulator alone, a considerable saving can be made in the cost of cables by separating the engine and battery room. This question, therefore, can only be decided after a study of all the working conditions. In any case, it must be remembered that there should be no direct communication between the dynamo and cell room, or the cotton insulation will be found to rot off the dynamo after a few years.

In selecting a type of accumulator, the main question is absence of attention, which can only be obtained by having the plates well apart, say half an inch, so that any detached portions fall away, instead of bridging across and exhausting the cell. If one or two cells are empty the light will be bad, although all the rest may be perfect.

A slight increase in internal resistance is of minor importance compared with the extra reliability obtained. In the writer's opinion, a clear space between the plates is also preferable to enclosing them in any form of celluloid bags or wrappings, which soon become clogged with oxides. If space permits, arrange the stands to be accessible from both sides, as they can be more easily examined and handled.

Meter.—The use of a registering meter is recommended in the engine room as the best check on the amount of coal, oil, or gas consumed. It also shows whether the lights have been left burning, or used extravagantly.

Position of Engine House.—Place with due regard to prevailing wind, and not less than fifty yards from the main building.

Cost.

Having considered local conditions as to smoke, smell, noise, and labour, the next question is the relative cost of working and first cost. The following data may be taken to apply to the average country house installations, and will assist in determining the class of motive power to be adopted:

A unit = 15 lamps of 16 candle-power lit for an hour.

Fuel.	Coal required per unit	12 lbs.
	Gas required per unit	50 cubic feet.
	Petroleum required per unit	$1\frac{3}{4}$ pints.

Thus, for purposes of comparison, the cost of fuel for the engine will be equal with—

$$\left.\begin{array}{l}\text{Coal costing 22}s.\text{ per ton}\\ =\text{Gas costing 2}s.\ 4\tfrac{1}{2}d.\text{ per thousand feet}\\ =\text{Petroleum costing }6\tfrac{1}{2}d.\text{ per gallon}\end{array}\right\} = 1{\cdot}4d.\text{ per unit.}$$

The above is a liberal estimate providing for cost of getting up steam and contingencies.

Although coal usually costs less than 22*s.* per ton, and is therefore cheaper in running cost than the other engines, a provision must be made for the additional labour, which usually brings the total to about the same figure for a country house of average size.

For large installations the cost per unit is naturally lower. The following are the results of a week's recent test with a modern generating plant for 2,000 lights, designed by the writer:

Coal for engine	·572*d.* per unit
Labour	·395 „
Lubricating oil	·056 „
Water—say	·040 „
Repairs—say	·091 „
Total running cost per unit	1·154*d.*

Labour.—It is difficult to determine the exact provision for labour, but assuming that the man can, in the case of gas or petroleum engines, attend to other work while the engine is running, whereas he must stand by a steam engine during the run, the following will act as a guide:

A turbine will occupy one-ninth of his time.
A gas engine will occupy one-sixth of his time.
A petroleum engine will occupy one-fourth of his time.
A steam engine will occupy one-half of his time.

With a well designed installation it is no longer necessary to have a skilled engineer to work the plant, provided everything is large enough to do its work easily. With such a plant, any estate hand, groom, or gardener can be taught to handle the apparatus, but if the first cost is cut down and the plant is strained, it is often necessary in the after working of the plant to spend double what should have been necessary.

Working Cost.—The total units per annum per lamp fixed may be averaged at seventeen for a house inhabited for most of the year, and the average running cost at 3*d.* per unit, or for 150 lights fixed, which is a fair sample for a medium-sized country house, an annual cost of £37 10*s.* This includes provision for labour and repairs, but not for maintenance and reserve fund, for which a sum of £37 10*s.*, or 5 per cent. on £750, may be laid by annually, though it should not be wanted for several years. If interest is to be added, an allowance must be made for the cost of gas apparatus or lamps that would otherwise have been required.

The above are general figures which will vary somewhat in each case, but the writer has taken them from the results of several hundred installations which he has designed and laid down, and it is hoped they will form a useful guide in deciding what generating plant to adopt.

Treatment of Rooms.

Light resembles happiness; it is a matter of contrast, and must be treated accordingly. Mr. Alma Tadema has a small door to his atrium, in order that its size may be the more felt on entering; so must the degree of light be graduated throughout a building. On entering a dimly lit hall from the dark it appears brilliant; but this, again, must be eclipsed by the light of the reception rooms. So, too, we must, as in a good photograph, have our light and dark portions and our semi-tones, for a room lit equally throughout gives a flat effect, and is neither artistic nor restful.

It should also be remembered that the pupil of the human eye has considerable power of expansion and contraction, and in the presence of a bright light an involuntary contraction takes place. When reading with the pupil contracted, a tired feeling is produced which may ultimately result in eye troubles. There is little doubt that the ignorance of electricians concerning this simple fact is responsible for the complications ascribed by oculists to the electric light itself. The filament of a lamp is the size of a thread, and the eye must not be subjected to the direct rays of this concentrated form of light.

Take two lamps of equal power—one with a clear globe, the other frosted. Although we know that photometrically the frosting obstructs about 10 per cent. of the light, the remaining 90 per cent. gives more apparent light, because it emanates from a larger surface. Thus the secret of a restful light is the illumination of a large surface with an absence of any dazzling spots of small area. In a room thus lit the pupil of the eye expands to its full limit, and the weakest eyes can read with a comfort that cannot be obtained in any other way.

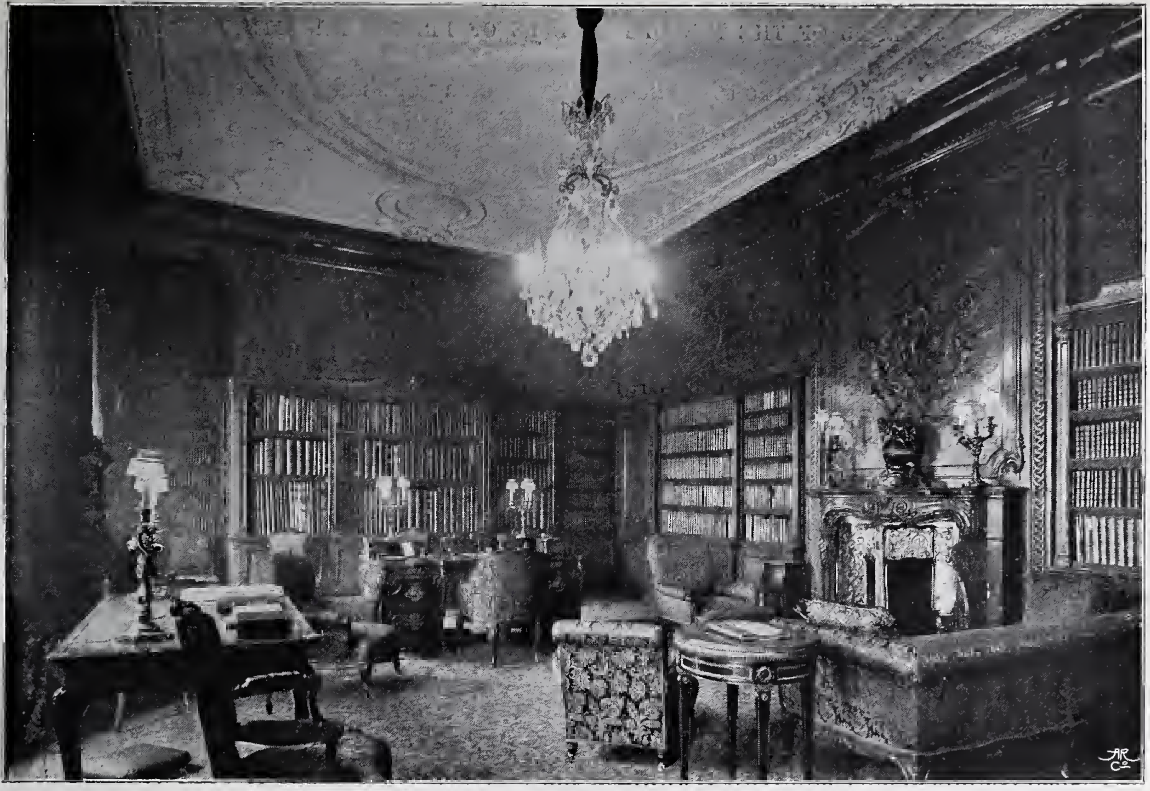
To get this result we must either diffuse the rays by transmitting them through a large shade, or we must trust to reflection and project the direct rays on the walls and ceiling from some hidden source [*see illustration*, p. 87]. The illuminated surface is then greater than that of even the largest shades, and the effect more restful. We are, however, practically debarred from this treatment on the score of expense unless the colour of walls and ceiling is very light; in the latter case, it is capable of wide adaptation. The writer believes he was the first to employ a combined shelf and picture rail containing a row of hidden lamps for reflected light. Pretty effects can also be produced with small lamps concealed in the overmantel and in china cabinets [*see illustrations*, p. 89].

Fittings.—We next come to the question of fittings, which to the user is a most important item, though to the electrical engineer it is frequently considered merely a matter of selection.

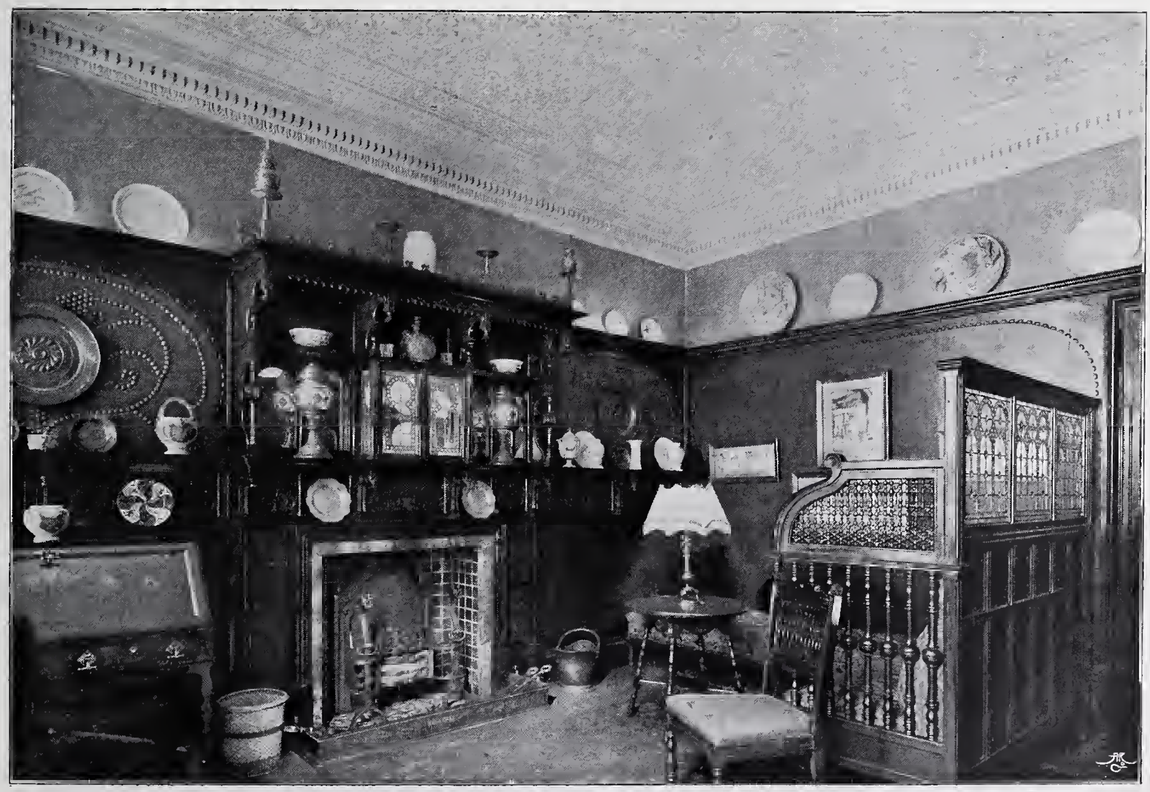
In old houses we are practically tied to an adaptation of the candle fittings in existence, for they are usually in accordance with the style of the room. Objection is sometimes raised to the use of imitation candles as being inartistic, but it must be remembered that the designer had the candle in view as the basis of his outline, and without it the proportions are wrong, and the drip cups and other parts meaningless. An incandescent lamp springing direct from a candle socket is a squat abortion that has nothing to commend it.

If, therefore, these fittings are to be retained, every effort should be made to get the precise effect of candles without their disadvantages, and as far as possible to conceal the fact that electric light has been employed. The writer remembers once at a dinner party a guest congratulating his host on having kept to wax candles on the table—and by the way, he added, "What good candles they are!"

Examples are shown of the way in which old fittings may be treated without detriment



TYPICAL LIBRARY LIGHTING.



REFLECTED LIGHT IN MESSRS. DRAKE AND GORHAM'S OFFICE.

to their appearance, and attention is called to the economy of shading only the front of lamps placed against a wall, for thus the full advantage of reflection is obtained, and an 8 candle-power lamp will take the place of a 16 candle-power if totally enclosed.

For shades an equally pretty substitute for silk has yet to be found; but horn, glass, and beads are all capable of cleaning, and paper is cheap to replace. Celluloid is dangerous, as it is capable of being ignited by the heat of the lamp. A hint must be given as to the necessity of testing these with electric light before making a selection, for if chosen by daylight alone, the result is often disappointing. It is possible to dispense with metal fittings altogether by working the lamps into plaster-work in the ceilings; but this treatment, unless carefully arranged, gives a patchy appearance, and lowers the rooms. There is also a risk of blackening the ceiling near the lamp, due to the currents of air produced by the heat of the filament.

Care must always be taken to leave a clear space round the lamp to avoid risk of fire, for an incandescent lamp under certain conditions produces heat enough to char woodwork: for the same reason lamps must be kept clear of drapery and curtains.

The following hints on the treatment of the different rooms may be of service:—

As vertical lines on the walls give the idea of height, and horizontal lines dwarf a room, so lights placed low as standards or brackets should be preferred in low rooms to pendants or electroliers hung from the ceiling.

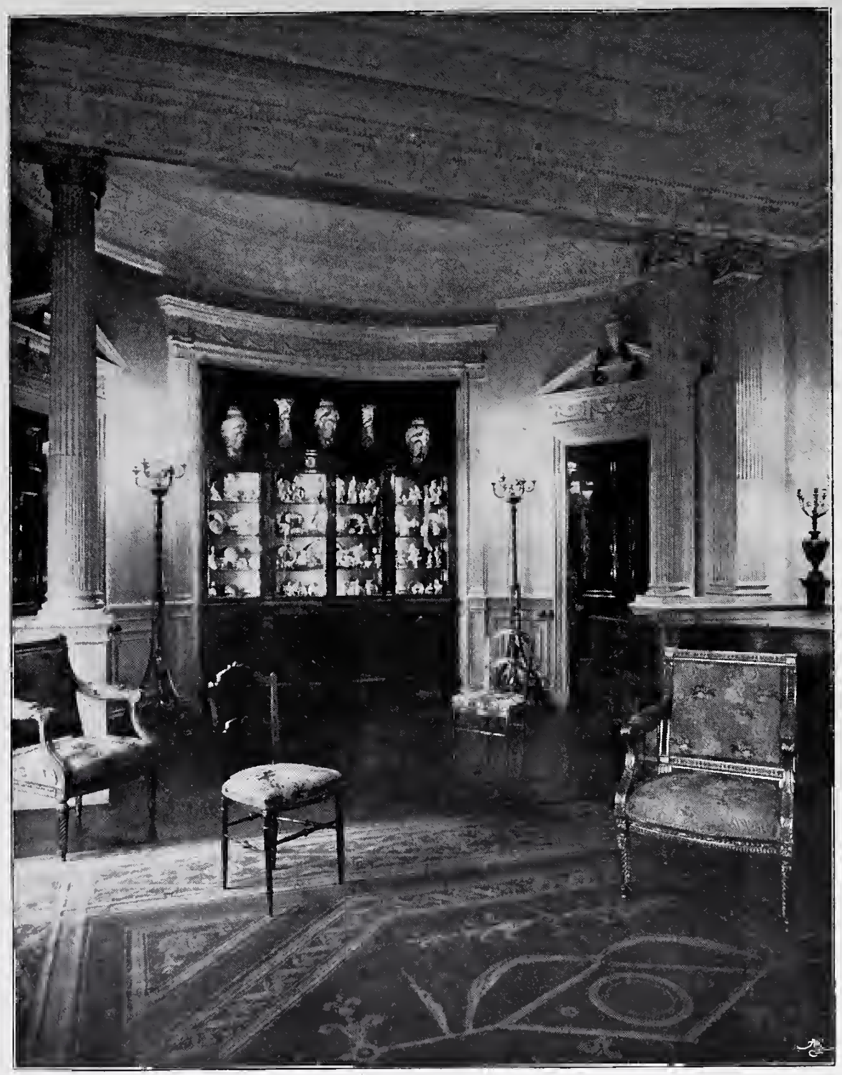
Dining-room.—The prominent feature should be the table, which may be lit either (1) by a shaded counterweight lamp with white inside and some art shade of pink or terra-cotta outside, so that the transmitted light may give a becoming colour; or (2) by the adaptation of the candle-fittings as shown in the specimens exhibited. In the latter case the wires are distributed by a patented connector lying under the table centre, and so contrived that neither the table nor the cloth is pierced.

The rest of the dining-room should be in repose, with shaded lamps to meet practical requirements. One of the best effects produced by the writer is at Chatsworth, where powerful lamps are hidden in reflectors at the base of the pictures all round the room. This not only lights the pictures, but also illuminates the ceiling, and gives a cheerful effect without that tired feeling which is a frequent source of complaint in electrically lit dining-rooms.

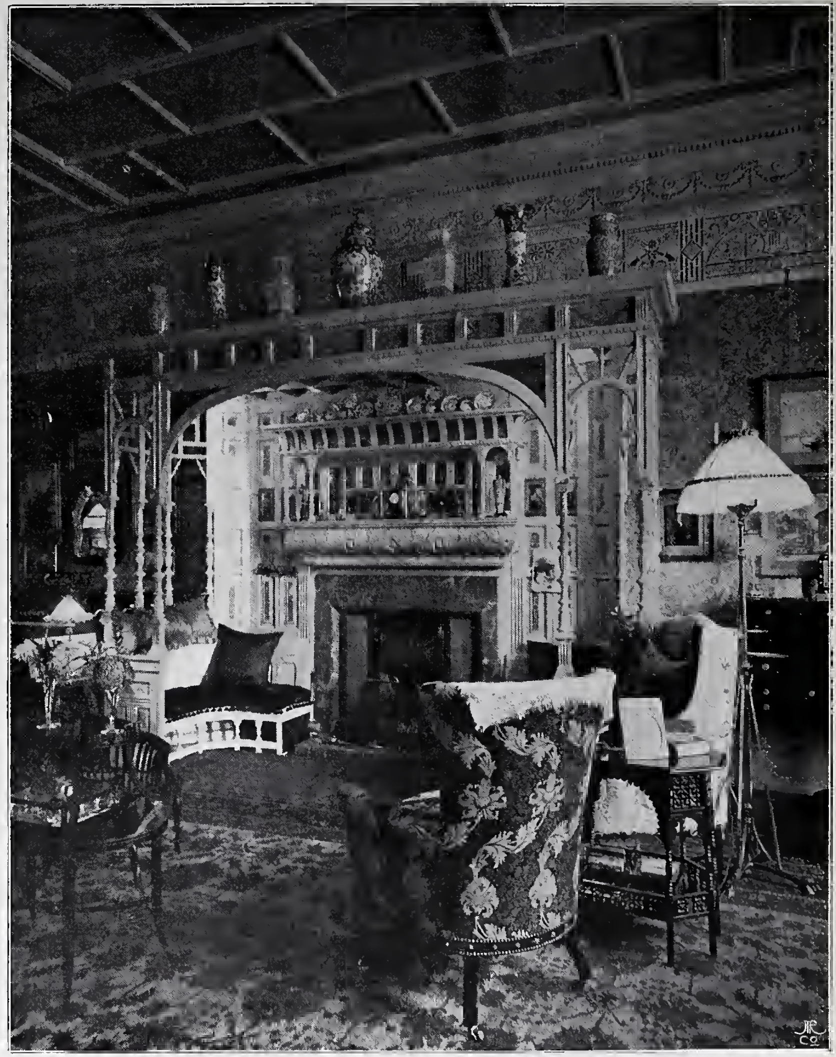
Drawing-room.—This room should be the most brilliant in the house, and must be treated for ordinary use with additional lights for receptions or dances. Where possible, the writer prefers to light principally from the walls and from standards, as a top light is unbecoming to ladies, causing dark shadows under the eyes.

In order to provide for the alternative treatment required in summer and winter, a liberal use of wall attachments is recommended. Objections are sometimes raised to these on the score that they are unsuitable if the room is used for a dance, but this difficulty can be overcome by suspending side-lights from the picture rail, current being conveyed to the lamp by a silk cord lying flat against the wall.

Bed-rooms.—It is usual to place two lights near the dressing-table, and it will be found that there is considerable diversity of opinion as to the most popular treatment. In lofty rooms cords pendent from the ceiling are unsightly, although for low rooms two counterweight pendants carefully placed will usually meet all practical requirements. An alternative treatment, which has the advantage of enabling the dressing-table to be moved or placed at an angle, consists of two jointed brackets attached to the uprights of the mirror, and carrying sliding arms capable of being raised or lowered at will. The same advantage applies to the use of two standards on the dressing-table, which should preferably be made telescopic.



CONCEALED LIGHTS IN CHINA CABINET.



ILLUMINATED OVERMANTEL.

By the bed, or in large rooms on each side of the bed, a bed-standard with a swivelling shade should be provided, with hooks in convenient positions to enable the fitting to be used as a bracket when required, the switch for this lamp being placed within easy reach.

In passages and staircases two-way switches should be fixed in such positions as will avoid the necessity of traversing any part of the building in the dark. Switches should, as a rule, be fixed near the door, and in well-decorated rooms should be sunk to render them as inconspicuous as possible, which is usually preferable to any attempts to conceal their unsightliness with ornamental covers.

Picture Lighting.—For the general illumination of the room reflectors are most useful if placed at the base of the picture, for by this means the light is thrown on to the ceiling and diffused into the room. With large pictures, however, it is frequently necessary to supplement these with a top reflector, in which case the lamp must be placed sufficiently high to prevent the reflection of the lamp itself throwing a bright patch on the picture, the angle of reflection being of course equal to the angle of incidence. Side-lights can only be used where the pictures will not be seen from any position where the lights themselves will be visible.

Before concluding, the writer wishes to make a passing reference to the improvements in gas and oil which are constantly being brought to public notice as the latest rivals of electric lighting. Statistics have shown that these are an absolute benefit to the electrical industry, for frequently the most difficult problem before the electrical engineer is to educate the conservative householder to the necessity for more light than has sufficed for his ancestors. If only he can be induced to adopt a brighter light, even if produced by one of the latest forms of gas or oil apparatus, the low initial cost of which is certainly enticing, he will never be willing to return to his former condition. Then after a short time, when the absence of oxygen, the smell, and general stuffiness have become quite unbearable to him, history again repeats itself, and one more name is added to the long list of those who use and appreciate the electric light.

II. PRACTICAL APPLICATIONS OF ELECTRICAL POWER.

By H. R. J. Burstall, M.Inst.C.E.

ELECTRICAL POWER is now used for such a number of purposes that in preparing a Paper on its practical applications the author, to keep the length of such a Paper within reasonable limits, must consider the particular interests of the Institute, and this has led to the exclusion of perhaps the most interesting, and certainly the most important of its applications.

Electrical traction, both on tramways and railways, the transmission of power from central stations in mines, mills, and works, are matters which fall entirely within the province of the engineer, and are only of general interest to the architect. This Paper will, therefore, to an engineer, seem somewhat like *Hamlet* without the Prince of Denmark, but the author trusts that this shortcoming will not be of such importance to the present audience.

To enumerate and describe the various practical applications of electrical power in connection with work in non-manufacturing premises would be a task sufficient to tax the patience of both the author and the audience, and would then only resemble an abstract of a number of trade catalogues. The author therefore proposes rather to deal with the general principles underlying the application of electrical power, to describe a few typical forms of apparatus, and to discuss the question of the cost of power under ordinary circumstances.

Electrical power, generally speaking, can be applied wherever gas or steam-power can be used, and in many instances where gas or steam-power is impossible of application. It differs, however, from gas or steam in that an electrical motor is not a prime mover—that is to say, it is only an apparatus for the transformation of electrical energy into mechanical power, not an apparatus for transforming the potential energy of fuel into mechanical power. Owing to this some source of electrical power must be available before an electric motor can be used.

There is now hardly a large town in the United Kingdom in which public supply mains for electrical energy have not been laid down, in at least part of the streets; and the effect of the general demand has been to reduce the price to such a point that electrical energy can now generally compete with other forms of power. In addition to the public supply mains there are numbers of large buildings in towns which have electrical installations of their own, and many country houses have plant for the supply of light and power.

Electrical energy is supplied to consumers from the public supply stations either on the continuous or alternating current systems, but the modern tendency is to supply entirely on the continuous system, largely in view of the increasing demand for power. Generally speaking, all private installations are on the continuous current system.

The question of installing electric power in factories and such like buildings, while affecting the architect as to the arrangement of the power house, is, in the author's opinion, purely an engineering and financial one, and he has therefore not considered it in the present paper, confining himself to the applications of power to be met with in premises where the question of power is a small matter compared with the other uses to which the premises are put.

Electrical power, as distinct from lighting, in buildings for non-manufacturing purposes, can be and is generally applied to, roughly, five classes of use:—

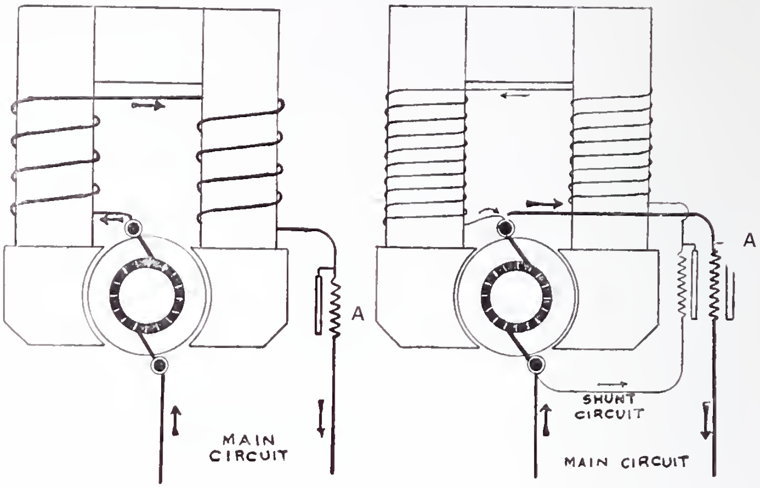
Lifting and hoisting.
Ventilating.
Driving machinery for small trades and for domestic purposes.
Pumping.
Heating and cooking.

In all except the last class electrical power is applied by means of electric motors, the particular purpose for which it is to be used necessitating often special types of motors, gearing, and regulating apparatus.

Motors.

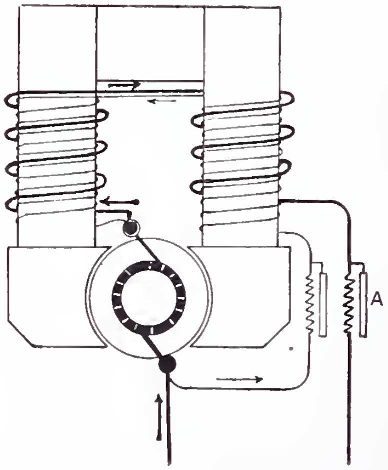
Most motors, as has been said before, are supplied from a continuous current system, the electrical pressure varying from 100 volts to nearly 500 volts, a pressure of from 200 to 250 volts being now the most usual. Motors can be and are run off alternating current supplies, but at present are neither efficient nor cheap, and although the question of alternating current motors is one of great interest to the engineer, and may possibly be of more considerable importance in the future, the author does not consider it of sufficient practical importance at the present time to discuss in this Paper.

An electrical motor consists essentially of a fixed part, generally the field magnets and their coils, and a moving part, the armature, from the spindle of which the power is taken off to the machinery. Either the whole or a part of the current is carried through the coils on the magnets, and a magnetic "field" is produced in the space in which the armature is placed. On a current being passed through the coils on the armature it is caused to rotate at a speed depending on the electric pressure at the terminals of the motor, the number of coils on the armature, and the strength of the magnetic field; the strength of the magnetic field depending on the number of coils of wire on the magnets and the current passing through them. An increase of the pressure at the terminals of the armature increases the speed, and an increase of the current in the field coils decreases the speed. An increase in the current through either the coils on the armature or magnets increases the turning effort or torque of the armature. From the above it will be seen that the regulation of speed and power in an electrical motor is carried out entirely by electrical methods, no sort of governor, as in a steam or gas engine, being usually required. All motors which are used for the purposes under consideration are usually supplied at a constant electrical pressure, and are generally made in three types to suit the conditions under which they have to work and the machinery which they drive. Where constant speed is required, what is known as a shunt-wound motor is used; in this, only part of the current is taken through the coils of the field magnets, this part of the current not passing through the armature. Where a large turning effort is required and not a constant speed, a series motor is used, the same current passing through both the field and armature coils. An intermediate type is used in a number of cases in which the magnets are wound with a double set of coils, one of which carries the same current as the armature and the other a separate "shunt" current, the proportion of the two different sets of coils being arranged to suit the work to be performed. It will thus be seen that it is not sufficient to know the power required for a particular purpose, but also the conditions of running, before selecting the type of motor required, and



SERIES MOTOR SHUNT MOTOR

A, Regulating Switches.



COMPOUND MOTOR

this selection can only be made from previous knowledge of the work or by experiment under working conditions.

The regulation of a series motor can only be carried out by variation of the pressure at its terminals, and it is done by the insertion of more or less resistance in its circuit; if such resistances are used for any considerable period, considerable waste of energy is incurred, but as series motors are used generally for lifting and hoisting, this is not of great importance.

Shunt-wound motors can be regulated by inserting resistances either in the armature circuit or in the field circuit. In the latter case practically no waste is incurred, but the range of regulation obtained is small, being about 20 per cent. in ordinary motors. It is important when ordering or arranging for motors that the whole of the conditions of working be known, so as to avoid running them with resistances in circuit when under their normal conditions of work.

The speeds of electric motors, as usually supplied, are generally high, being about from 1,000 to 1,500 revolutions per minute for sizes from one to five horse-power; but motors running at much lower speeds than this are being largely built, and it is now possible to buy motors running at speeds of from 200 to 500 revolutions per minute at reasonable prices. The use of slow-speed motors is largely increasing, the extra first cost being compensated for by the reduced wear and tear, and by the advantage gained through direct coupling the motors to the machines.

Lifting and Hoisting.—The use of electrically driven lifts and hoists has greatly increased during the last few years, even in districts, such as the Metropolitan one, in which hydraulic supply can be obtained. Speaking broadly, the machinery of an electric lift consists of a winding drum driven by an electric motor (almost always of series type) through belts or worm gearing, the cage being lifted by wire ropes on the winding drum, the electric motor being controlled by a switch for varying its speed and direction of rotation, the switch being worked from a rope in the cage as with hydraulic and other lifts. The safety of the cage is provided for as in other lifts by special mechanism, which, if the lifting-rope breaks or becomes too slack, forces out wedges or catches on the guides, holding the cage secure in position. This, however, does not provide against the failure of the electric supply, and electric lifts are generally provided, in addition, with a brake which is always on unless current is passing through the motor. Although the broad principle of electrically driving lifts is quite a simple one, the actual machinery has to be most carefully designed and arranged, special motors and switches and gear being employed by manufacturers who have had experience of lifts, as without these an electrical lift is neither efficient nor economical, the wear and tear on an improperly designed and constructed lift being very great.

Ventilation.—Electric motors lend themselves perhaps better than any other means of driving to the purpose of operating fans, whether large fans for the ventilation of a building on some complete system, or small fans for extracting the air from particular rooms, or even for stirring up the air in any room in the manner of a punkah.

Most of the makers of fans now design their fans to be driven direct by electric motors, as the high speed at which small motors must run to be economical in first cost enables the size of the fan to be reduced to a minimum, but many fans are still driven from the motor by means of belts. Considerable trouble is sometimes caused by the noise of the fan running at high speeds, and even by the hum of the motor, and these troubles are often intensified by the air shaft acting as a resonator. Special care should be taken to avoid this, and the fan and motor should, wherever possible, be carried, not from the sides of the air trunk, but quite separately from a substantial wall. The noise, however, is often caused by the pulsations of the air set up by the blades of the fan if they are not properly shaped, and in this case little can be done except to alter the fan; sometimes, however, the note produced by the fan harmonises with the natural note of the air pipe, and in this case the noise can be reduced and even stopped by running it at a different speed.

The motor and arrangements for driving fans call for little comment, as they are usually of ordinary type, the fans used being the same, however they are driven.

It is usual to fit fan motors with switches for altering their speed to suit the conditions under which they are to run, and it is advisable to arrange the switches and their resistances so that the motor runs most economically when at the speed it is most generally used.

Pumping.—Pumps driven by electric motors are now being used for almost every purpose, even in the boiler-houses of electrical supply stations, for feeding boilers where steam is already in use, owing to their economy as compared with the usually very wasteful steam-pumps, especially when running slow. In buildings in cities, pumping plant is not as a rule much required, but there are instances in which electric pumps have been installed to pump water into high level tanks, and even to accumulators for working lifts. Electrically driven pumps are generally of three-throw type, so as to give a steady flow and so avoid hammering in the pipes, their crank shafts being driven through gearing by the motor. As motors generally run at a comparatively high speed, special care must be taken in the gearing to avoid noise, and a common cause of complaint against electrically driven pumps is the rumbling noise produced, which sometimes can be heard for great distances. This can be overcome to a great extent by the use of proper materials in the gear, or entirely by the use of worm gearing or belts, but these may be more wasteful in power than the ordinary spur gearing, unless properly designed. If the pumps have to work at various speeds, the arrangements for doing this must be well thought out so as to avoid waste of energy. If the range of speed required is great and the pump may have to work at slow speed for long periods, it may be advisable to wind the motor armature with two distinct sets of coils, and to provide arrangements by which these coils can be used either in series or in parallel with each other, thus varying the number of active coils on the armature.

Machinery.—Practically all classes of machinery can be and are driven electrically. Beyond enumerating the various machines capable of being so driven—which list would fill pages—there is little to be said as to this point. At the present time a number of printing machines are being driven electrically, as it has been found that the steady drive allows of much superior work being done at the same speed. Owing to the time occupied in "setting up" a printing machine, it is always standing a considerable proportion of its time, and as, unlike shafting, the motor uses no energy when the machine is stopped, very considerable saving can be made in the cost of power.

Many domestic machines, such as polishing machines, run at a high speed and are specially suitable for electrical driving, the machine often consisting of a simple motor with its spindle prolonged to carry a brush or polishing wheel.

Cooking and Heating.—It would appear, in view of the great number of transformations of energy from the boiler furnace at the generating station to the coils in the heating apparatus, and remembering that at every transformation there is a considerable loss, that heating by electricity could not compete in any way as to price with direct heating by means of gas or coal; and for any purpose where a large quantity of heat is required this is quite true. As, however, most ordinary heating operations in a house are carried on under conditions in which the heat utilised is only a very small proportion of the heat generated, it is possible, by properly applying the electric energy, to use such a large proportion of the energy as heat that the competition is rendered possible when other considerations as to dirt, &c., are taken into account. Generally speaking, heating by electricity is applied by passing a current through coils of wire of high resistance; the wires are embedded in an insulating covering, and are heated, together with their covering, to the temperature required. Special precautions can be taken to prevent loss of heat, except to the material or space to be heated, and a small current, and therefore expenditure of energy, is required to keep up the temperature. Another method used for heating rooms is to pass the current through a number of glow lamps, the lamps being proportioned so that their filaments are not completely incandesced, the room then being heated by radiation as with an ordinary fire or gas stove. The lamps are arranged in special reflectors so as to obtain a "beam" of heat rays, and in the author's opinion this method of heating will be of great value, as the apparatus is simple, easily fitted and understood, and as free from risk of break-down as ordinary electric lighting apparatus. The heat obtained, being radiant heat, does not produce the enervating feeling produced more or less by all methods of heating by warming the air, and the effect produced is similar to that from an incandescent gas stove or bright red coal fire. The cost is referred to below.

COSTS.

Electrical energy is charged for at a rate of so much per Board of Trade unit, a unit being an amount of electricity which will keep an eight candle-power lamp alight for about thirty-five hours. This amount of energy is equivalent to 1·34 horse-power exerted for one hour. Most public supplies charge a much reduced rate for energy used for power purposes as distinct from lighting, the charge in many cases being less than half that charged for lighting, the lowest charge for power being made by the Corporation of Edinburgh, where it is 1½*d.* a unit. In London the average charge is from 3*d.* to 4*d.*

Lifts.—A passenger lift for carrying nine persons, running at a speed of 175 feet per minute, will require about 0·06 units per journey, taking the average of the day's work. This at 4*d.* per unit, which is a high figure, would be 0·22*d.*, or say one farthing. If run fully loaded, the cost per journey would be about 0·4*d.* at the same rate. A smaller lift for six persons would require about 0·02 units per journey, or would cost at the same rate 0·08*d.* per journey. The great advantage, in point of view of working cost, of an electric lift over an hydraulic lift is that the energy required varies with the load to be dealt with.

Ventilating.—Very few figures are available as to the cost of ventilating by electrically driven fans, and as the efficiency of such fans varies very considerably, and the power required to deal with a certain quantity of air varies enormously in each particular case, it is almost impossible to give figures of much practical use. Generally and very approximately speaking, one horse-power is required to deal with 20,000 cubic feet per minute, and this would correspond to about ¾ of a unit per hour, and at 4*d.* per unit would cost 3*d.* per hour.

Driving small Machinery.—For motors of one horse-power and under, it may be taken that one actual horse-power given off at the pulley of the motor will require the expenditure of one unit per hour. This at fifty-four hours per week and 4*d.* per unit will bring out the cost per actual horse-power per year at £48. 6*s.* It may be taken that a small gas engine of the same power, with gas at 3*s.* per 1,000 cubic feet, will cost about £20 per year for gas.

Electrical pumps have a total efficiency when well constructed of from 50 to 60 per cent., so that one pump horse-power will require the expenditure of about 1½ units per hour.

Heating and Cooking.—The author has not been able to obtain any reliable figures as to the cost of electrical heating on a large scale. An ordinary electrical radiator suitable for a small room costs, at 4*d*. per unit, from 4*d*. to 8*d*. per hour. The Dowsing glow lamp radiators require about ¼ unit per lamp, and a radiator of four lamps, which would be sufficient for a small room, would cost 4*d*. per hour at the 4*d*. rate.

The author has obtained from Mr. C. O. Grimshaw, engineer to the Westminster Supply Company, a number of figures as to the cost of cooking apparatus, and these are given in the Appendix below.

The author has given all costs of electrical energy at the rate of 4*d*. per unit, this being about the highest figure generally charged for electrical energy used for power purposes, but it is easy to reduce these costs to the particular charge made by any supply company. For private installations on a reasonably large scale, and economically worked, the cost may be taken as from 2*d*. to 3*d*. per unit.

The author would, in conclusion, draw the attention of those contemplating the installation of electrical machinery to the regulations of the various fire offices as to the use of electric motors so as to avoid any trouble after the apparatus is installed. The regulations in some cases are strict, and perhaps rightly so, as while electrical apparatus, if properly installed, is probably the safest from risk of fire, yet if carelessly or improperly arranged it may be, like a little knowledge, a dangerous thing.

APPENDIX.

COST OF RUNNING COOKING APPARATUS AT 4*d*. PER UNIT.

Description.	Capacity.	Cost per hour.	Cost for one operation from all cold.
Kettle	1½ pints	1·28*d*.	0·45*d*.
Griller	2 chops	2·24*d*.	0·53*d*.
Saucepan	2 quarts	1·6*d*.	0·8*d*.
Fish Kettle . . .	16 quarts	4·56*d*.	—
Domestic Iron . . .	Scorching paper	0·8*d*.	cost to heat up 0·13*d*.

⁂ The Papers were illustrated by a series of photographic lantern slides showing various electric-lighted interiors, such as Crewe Hall, Lansdowne House, and Londonderry House, treated according to the methods advocated in Paper No. I., some of which are reproduced on pages 87 and 89; and by others showing a 10 H.P. motor, a motor-driven lift and hoisting apparatus, ventilating fans driven by electric motors, electrically driven pumps, printing machinery, and polishing machine. There were also exhibited a number of fittings made expressly for electric light, together with examples of old candle fittings adapted for the same purpose, and a Dowsing glow lamp radiator in operation.

DISCUSSION OF THE PAPERS ON ELECTRICITY.

Professor Aitchison, R.A., *President*, in the Chair.

Mr. E. M. MONKHOUSE asked whether the wind-engine had ever been used in connection with electric lighting installation, except as an experiment. In summer there was very little wind, and in a shooting-box, or place of that sort, which was usually only occupied in the summer, a wind-engine would not be much good. With regard to the vibration of dynamos, that would be due more to bad belts when not properly jointed than to the balance of the armature. It was possible to get good and continuous belts without joints, and if these were used there was not so much fear of vibration. He thought Mr. Drake had made a mistake about the number of lamps that could be run for an hour by a unit of electricity—fifteen he understood him to say. [Mr. DRAKE remarked that if the Edison and Swan lamps were measured, they would be found to come out at fifteen.] As regards the cost of the large installation of about 2,000 lights, it would be interesting to know in what part of the country the installation was; what was the cost of coal per ton; what the installation was, the number of hours it was running, and also the load factor. As to the amount of light abstracted by a frosted globe, which Mr. Drake put at 10 per cent., he had always understood that at least 50 per cent. was taken up in that way. In one case he had had to deal with he had great difficulty in getting arc-lamp globes that absorbed anything like as little as 15 per cent.; that was with the ordinary opaline globe; and frosted globes absorbed a good deal more than the opaline globe. The arrangement of lights in front of a dressing-glass was a very vexed question, and had not received nearly enough attention. Mr. Drake's was a highly ingenious arrangement, but ladies wanted to see their back hair as well as their faces, and some sort of arrangement of lights that could be moved forward or backward or put behind them was rather desirable.

Mr. JOHN SLATER [*F.*], in proposing a vote of thanks to the authors of the Papers, said it was very striking to notice what an enormous advance had been made in electric lighting and in the use of electrical energy in the last few years. It was some seventeen years since he had first read a Paper on electric lighting before the Institute, and the difficulties of obtaining the light at that time were very considerable. A gas-engine had to be hired for the occasion, and an arc lamp was placed at the top of the dome. The late Mr. Spottiswoode lent him a few incandescent lamps, which had just been brought out by Messrs. Swan, to show what the light was capable of in small quantities. One of the most striking features of the latter part of this century had been the development in all sorts of ways of electricity, and the photographs Mr. Drake had exhibited of interiors he had lighted showed what an enormous variety of developments might be obtained in the way of lighting. For himself he certainly thought if one was able to hide the points of light altogether, and to get a sufficient amount of reflected light, the effect in any room was far better than by any arrangement of chandeliers, electroliers, or lamps of whatever kind. One does not want to look at the light itself, but at the objects which the light illuminates. In a thoroughly lighted room by daylight, a perfectly diffused light was obtained, and the object to aim at was to get by means of electricity a perfectly diffused light. With regard to what the last speaker had said about the amount of light absorbed by a ground-glass globe or a reflector, he seemed to have lost sight of the fact that however intense the point of light may be, nevertheless more available light was got from a frosted reflector than from a plain one, because it was more diffused. Although the actual light measured by the photometer might be very considerably reduced, yet, contrasting the two kinds of lamps, the actual effect was not anything like so much less from the frosted lamp as one might imagine. With regard to the radiator shown by Mr. Burstall, everyone must be very pleased to see it at work. The latest development in this as in many other cities was in the way of flats, and one of the greatest difficulties in a series of flats on different floors was arranging for the carrying of coal to the various rooms, and carrying away the ashes and dust. If a perfect system of heating could be got by means of electricity, even if it were a little more costly than gas, it would be an enormous advantage in the flats now being put up in London. With regard to other developments of electrical energy, anyone who had seen the workshops, where machines of all kinds were driven without belts, without oil, and without all the paraphernalia of steam driving, must have been impressed with the enormous advantage, looked at apart from the question of cost, that the electric-motors gave us; and with a reduction in the cost per unit, the future of electrical motive power was a very great one indeed, and more far reaching than could be foreseen at present.

Mr. BERESFORD PITE [*F.*] said he should like to have the privilege of seconding the vote of thanks which Mr. Slater had moved for the two very lucid and clear papers with which they had been favoured that evening, and for the admirable way in which those papers had been composed with a view to meeting the comparative ignorance of architects, and the difficulties they might have, as laymen, in dealing with a highly technical subject. The advantages and disadvantages of the several methods had been stated so clearly that the papers would be very useful for reference. He should like, however, to enter a decided protest against accepting the artistic effects produced and illustrated by the photographs as in any way satisfactory to the architectural mind. He was aware that the subject of artificial lighting was distinctly an artistic subject, and an artistic subject on which very little that was certain could be said. But he would like to suggest that the decidedly ingenious and highly original methods of masking lights behind carving, jamming them close up against the wall in the edge of a frieze, creating objectionable dark spots in front of pictures, and throwing violent and unnatural lights upon portions of them, must have an exceedingly unpleasant effect. He had seen it in one or two houses in the West End with very great regret, and had noted the disastrous effects artistically upon the pictures hanging upon the walls and the general effect upon the room. If their electrical engineering friends would consult painters and sculptors, they would find that there was not very much appreciation possible for the magnificent ingenuity which lighted up the wall rather than the room, and which irradiated the picture instead of the chair or the table at which they wanted to sit. His point was that the room artistically and architecturally suffered from being treated in this dramatic and theatrical and what he was inclined to call unnatural way. He would much sooner see a handsome chandelier, or an apparently grouped artistic treatment of manifestly visible lights, than the very clever, mysterious effects produced by concealed lights. He could not help suggesting that the plaster-work, which was modelled and designed for the wall, was not modelled and designed with a view of being examined under a highly powerful light at close quarters; the general effect for which the architect designed buildings for daylight would be completely lost; and he would not know how to proceed in colour relief or shadow if he were subject to a whole array of electric lights attached outside some little bit of detail which took the fancy of the owner or of the electrical engineer. With regard to motors, he would like to know the comparative prime cost of the motor itself, of a simple form, available for direct action with a fan. The comparative cost of the motor itself was a matter of some interest.

Mr. E. W. HUDSON [*A.*] remarked upon the great difference in the cost of supply per unit in Edinburgh, where it was only 1½*d.*, and in London, where 4*d.* was charged. Was that difference due to competition, or to the want of competition; or was there any other reason for it?

Mr. DRAKE, replying to Mr. Monkhouse's question about the wind-engine, said that a large wind-engine had been in operation for lighting purposes at Mr. Cadbury's house, near Birmingham, for about eighteen months. The returns showed that the number of hours during which a really useful charging current could be obtained was very much larger than many people imagined. The establishment contained about 200 lamps, he understood, which were supplied mainly by the wind-engine, although on occasions an auxiliary engine was necessary. In this instance it was estimated that the wind supplied sufficient energy to pay the interest on the first cost. Mr. Stevens was now intending to erect near Salisbury the biggest windmill made, and he (the speaker) had lately gone over the matter with him to see whether it was possible to get 40 horse-power available from it. He proposed to store the energy from the windmill in accumulators, and to transmit it all over his farm at high pressure for farming purposes, keeping a steam-engine in reserve. The results obtained from tests made by the Meteorological Society showed that the average number of hours during which a wind of over twelve miles an hour could be obtained was very considerable—he believed, something like eight hours a day. At the same time, in England a wind-engine was only useful for auxiliary purposes because of the long periods when wind was not available. If, however, it produced electricity sufficient to pay the interest on its cost, it was worth doing. He proposed to put one down at his own house shortly, to test it for himself near London. As regards vibration, that might be due to the belt as well as to bad balancing; but a bad belt would produce a slow shaking, which is quite different to the vibration due to bad balancing. The 2,000-light installation he had spoken of was at the Auxiliary Army and Navy Stores. The plant consisted of three Willans's *F.F.F.* engines and three boilers, each capable of working one engine and dynamo, and each of about 100 horse-power. The load factor was the usual one for a London central station; in the morning there were a few lights on at the Stores and in the evening a full light. The results were taken over a week by the meter reading, and were, so far as he remembered, about 3,500 units a week. With regard to frosting, a practical illustration shown, viz., two lamps of equal candle-power in two separate block boxes, demonstrated that the frosted lamp gave more apparent light than the clear glass. On the question of lighting dressing-tables, the simple problem mentioned had been already worked out. A tall standard lamp had been designed for Lady Londonderry to throw a reflected light on the back of the head. With regard to what had been said about dramatic effects, of which one architect did not approve, this really was not the verdict of well-known artists. In the day-time they had one effect of light, and at night-time many people preferred a different one, they liked to see the good features of their rooms brought out and made objects for admiration; by artificial light their rooms were given a totally different appearance from that of daylight. At the same time, as the photographs showed, there were a large number of rooms in which the chandeliers, which his friend regarded as the only satisfactory way of lighting, were retained.

Mr. BURSTALL, replying to a question, said that a 4-horse motor would cost about £60. The prices of two motors of the same power but running at different speeds would be, roughly, in inverse proportion to their speed. As to relative prices for current, that opened up a very wide field. Edinburgh was a special case in which the installation had been extremely successful, partly owing to the very spirited policy of reducing the price as soon as possible. In London there was competition, and a big demand, and the companies get good prices as well.

Since the Meeting Mr. Burstall has kindly sent the following particulars as to the prices of motors:—

Power.	Speed.	Approximate price.
1 B.H.P.	1,100	£30
2 B.H.P.	1,000	£38
3 B.H.P.	850	£48
4 B.H.P.	800	£58

Travelling Studentship for Study of Decoration.

The Painters' Company again offer a Travelling Studentship, value £50, for the encouragement of the study of Decoration. The studentship is open to competition by students between the ages of twenty and thirty-five in any recognised school of art or other institution devoted to the study of Applied Art in any form, and situate within the limit of the larger Metropolitan postal area. Particulars are obtainable from the Clerk to the Company, Painters' Hall, 9, Little Trinity Lane, E.C.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS 1834
INCORP. 1837 1887

9, Conduit Street, London, W., *24th December* 1898.

CHRONICLE.

The late Professor Hayter Lewis [*F.*].

The funeral of the late Professor Hayter Lewis took place on Wednesday the 14th inst. at St. Stephen's Church, Bayswater, and at Kensal Green Cemetery, in the presence of a large circle of his family and friends. Among the latter were Mr. Alexander Graham [*F.*], F.S.A., Mr. J. Tavenor Perry [*F.*], Mr. Fred. H. Reed [*F.*], and Mr. Charles Henman [*A.*]. The Secretary of the Institute attended the church ceremony on behalf of the Institute. It is hoped that there will be a full memoir of Professor Lewis in the next number of the Journal.

The Hon. Secretary, in making the formal announcement of the Professor's death at last Monday's meeting, referred to his long connection with the Institute, which began in 1845, when he was elected Associate. In 1852 he became a Fellow, and subsequently served as Honorary Secretary for some time. He was twice elected Vice-President, and it was perhaps only owing to his ill-health that he was not elected to the Presidential Chair.

The President: Gentlemen, I wish to move a Vote of Condolence with the family of the late Professor Hayter Lewis. You have heard that he was Honorary Secretary and Vice-President. He was always ready to give his counsel and advice on all difficult questions. I had known him for a great many years. He was a most accomplished architect, and a perfect friend and companion. I had the honour of being associated with him in looking over the papers and drawings of Mr. Wood, who discovered the Temple of Diana at Ephesus. Amongst his other claims to the notice of architects, he was the author of the treatise on 'Architecture' in the *Encyclopædia Britannica*. He has died, it is true, full of years, but during the later part of his life he was very much troubled with illness. I am sure you will all concur in passing this resolution of condolence with his family.

Mr. John Slater [*F.*]: I shall be very pleased, Sir, to second the vote of condolence. You, Sir, have not mentioned, nor has the Hon. Secretary, one of the claims to respectful and grateful memory which Professor Hayter Lewis has upon us. Many of the members of the Institute who, like myself, have by this time arrived at middle age must remember his Professorship of Architecture at University College, in succession to the late Professor Donaldson. I attended those classes for several years, and, although I do not think that Professor Hayter Lewis was an ideal lecturer, yet I can safely say, what I believe will be borne out by every one who attended those lectures, that his one aim and his one desire were to give as much help as he possibly could to all the students of those classes. The Professorship of Architecture at University College was held, I think, for the first time by Professor Donaldson, and Professor Hayter Lewis succeeded him. Many of us in this Institute have reason to remember with gratitude the help that we received from Professor Hayter Lewis while he occupied the chair at University College.

The resolution, as entered upon the Minutes [p. 104], was then read by the President, and carried in silence.

The recent New York Fire.

Mr. W. Wonnacott [*A.*] makes the following interesting communication :—

I have received a few notes from a friend in New York who has had an opportunity of examining the ruins of the building recently burned down, owned by Messrs. Rogers Peet & Co., and of its sky-scraping neighbour the Home Life Insurance building. The loss and damage amounts to $750,000, and is amply covered by insurance, distributed among forty or more companies. It has been declared by experts who have seen the buildings concerned, on their periodical visits of inspection, that the fire was the work of an incendiary, and originated in the basement of the Rogers Peet building, where nothing of an inflammable character was stored, or allowed to collect there.

My friend gives a vivid account of the progress of the fire, and of the wrecking next day of the burnt out building. He witnessed a fall of coping from the thirteenth storey, the large blocks striking a balcony at the fifth-floor level, and breaking through it as if it were a cobweb construction. As the gentleman I speak of, a professional colleague, is visiting New York in order to study fireproof construction there, he took the opportunity of accompanying one of the experts engaged in inspecting the ruins, who had to report to his bureau in another city of the States. He refers very emphatically to the value of the party-wall of the Rogers Peet building in preventing the further spread of fire down the side street. This party-wall divided the premises, and was carried to a height of *several feet* above the roof, thus forming a veritable bulwark against the lateral spread of the fire, and saved the western half of the building. But upwards, where the fire could rage unchecked, he found that portions of the neighbouring Insurance building had apparently been in the fiercest part of the fire, particularly the court or light well.

The steel skeleton of the structure has apparently suffered not at all, but its stonework facing has stood the effects of fire and water very badly: the wall facing the burnt-out building is practically ruined, and it was thought by the experts that the mutilation would have been greatly diminished had brick or terra-cotta been used instead.

The iron struts across the light well were sadly twisted and buckled, while the iron mullions of the windows opening on to the internal court, which were not protected in any way, were on nearly all the floors bulged outwards, and the ironwork frames of the windows themselves seriously damaged and bent by the intense heat.

Internally there was very great damage done ; but none of the iron-framed floors appear to have suffered in any way, except that the floor girders in some instances are exposed on the underside, where the concrete has dropped away from the wire lathing ; but the brick and concrete arches between the beams remain practically intact.

The main stanchions carrying the heavy floor girders were in every case protected with terra-cotta blocks, and these did good protective duty where the fire was fiercest : though badly cracked, and occasionally broken away from the stanchions they protect, the latter appear to be quite uninjured.

But the singular damage to the internal fireproof partitions was almost universal. None of them were stayed by iron uprights, and none were of fire-resisting construction above a height of five feet from the floor, the remainder of their height being glass, or wooden movable shutters, and sashes, for the double purpose of lighting the internal passages and of allowing through ventilation in the summer. Nearly all these partitions were overthrown by the heat ; certainly no water came near those on the upper floors, *i.e.* above the eleventh story. Though numerous small fires were constantly breaking out on these higher floors, they were allowed to burn out, it being useless to attempt to reach them with the hose.

Such are briefly the important results upon the construction of this exceedingly costly fire-resisting building ; of the Rogers Peet building itself, where the fire originated, nothing remains.

The Fire Department was seriously handicapped by the excessive height of the Home Life Insurance building. Its failure in the present instance will probably hasten forward the scheme for an auxiliary high-pressure water supply that has been under consideration for several years ; and it will also probably bring New York into line with all the other cities of the States by the passing of stringent regulations as to the height of buildings, and possibly the reduction of the height of some of the existing business premises.

The bill prepared by the American Institute of Architects, and presented at Albany, still remains on its shelf. This bill was unanimously approved by the architects practising in the city. Perhaps the most valuable result of the fire described above will be the resurrection of this bill and its addition to the statutes.

Fireproof Construction.

No. 12 of the Publications of the British Fire Prevention Committee, edited by Mr. E. O. Sachs, is entitled *The Effect of Fire,* and comprises a Report on the Horne Building Fire, Pittsburg, U.S.A., drawn up by a committee of experts for the purposes of the insurance offices pecuniarily interested. The report has been carefully framed, and is elaborately illustrated with diagrams. Bound up with it are a number of photographs showing the condition of various parts of the building after the fire. A description is given of the general effects of the fire on walls, columns, girders, and beams, and results of tests of portions of the injured steel-work. The lessons taught are thus commented on in the report :—

1. In buildings of about this height the distortion of the steel framework due to the heat of the fire cannot in any instance be sufficient to work any serious damage ; nor is it probable that at any time would connection rivets be sheared off. This conclusion is arrived at for the reason that there is no probability that any future fire will be fiercer than the one at issue.
2. The method of fastening fireproofing to the underside of beams with sheet-iron strips should be discarded.
3. It cannot be too often reiterated that open front buildings like this should be protected from external fires by metal shutters, and also that all shafts should be provided with metal doors which can be readily closed at all floors.
4. The most important lesson taught by this fire was the lack of strength developed by the fireclay fireproofing. The building was permitted to move in any direction without any material restrictions by the fireproofing. The floor arches showed by the scaling off of the lower webs that they were unable to offer any sufficient force to counteract the tendency to lateral motion.
5. The column protection, although composed of the very best obtainable kind of fireclay tile, was also not of sufficient strength.

In our opinion it would have been necessary to dismantle the whole steel framework had this structure been fourteen or fifteen storeys high. The leaning at that height at the same proportion as developed would have entailed the necessity of taking the whole structure down.

Owing to the fact that steel columns or girders or beams after being subjected to a long-continued fire will assume the same temperature as fireproofing, and owing to the fact, furthermore, that the rate of expansion of the steel is much greater than that of the fireclay tile, destructive movements are permitted which, as shown in this experience, will result in considerable damage, and which damage will increase in direct proportion to the height of the building.

In view of these important developments, it is our opinion that important structures of this class should have a radically different method of fireproofing. The fireproofing should be in itself strong and able to resist severe shocks, and should, if possible, be able to prevent the expansion of the steel-work.

There seems to be but one material which is known that could be utilised to accomplish these results, and that is first-class concrete. The fire-resisting qualities of properly made concrete have been amply proven to be equal to, if not better than, fireclay tile, as shown by the series of tests carried on by the building department of the City of New York.

From the experience gained in street railway construction in laying continuous rails, it is to a large degree possible to prevent the metal from expanding. In street railway work this has been accomplished merely by the adhesion of the pavement to the side of the rails. In building construction the same results could be obtained by encasing the columns and girders with concrete placed directly against the steel-work. The adhesion of the concrete would to a large degree prevent unequal expansion of the concrete and steel. The floor arches should also be constructed of concrete, but of sufficient depth to be able to resist lateral forces. With the prevention of injurious expansion, and the protection of columns with materials that can stand severe shocks of any nature whatever, the modern steel frame constructed building would be more thoroughly protected against any fire.

The construction herein suggested should not materially increase the cost of construction. The solid concrete about the columns would add strength to same, and could no doubt be made self-supporting. The same could be said of concrete surrounding beams and girders, as has been amply demonstrated by the strength developed by concrete iron constructions such as the Monier and Melan arches.

One of the objections that would be raised against this construction would be that it could not be carried on in freezing weather. This is a proper objection, but there is no valid reason, in our opinion, why these structures should be built in winter any more than were the old-time brick structures.

As so-called fireproof buildings are not equally and to the same degree protected against fire, we would recommend to the insurance companies that they should vary the rate of insurance for this class of building, depending upon the character of the fireproofing used. The competition between fireproofing companies has been so severe as to reduce the price of their output in very many instances at the expense of quality. The large fire loss in the Horne building would still have been larger had the fireproofing been of poor quality ; and we would further recommend that the insurance companies have prepared standard specifications governing the character of the fireproofing and the construction and putting up of same, and requiring owners of buildings to use fireproofing subject to these specifications under careful inspection, or be subjected to higher insurance rates.

The Protestant Cemetery in Rome.

The following letters have been addressed to the Secretary by Professor Lanciani [*Hon. Corr. M.*], of Rome, and Mr. J. Tavenor Perry [*F.*] respectively. Mr. Perry's reply refers only to the first of the learned Professor's letters. The plan is reproduced overleaf, *italics and dotted lines* representing the proposed improvements. The matter is at present under the consideration of the Art Standing Committee :

Rome, 2 via Goito: 27th Nov. 1898.

"Dear Sir,—I am glad to inform you, in answer to your kind letter of Nov. 22nd, that there is not a particle of truth in the report that the municipal authorities of Rome contemplate the destruction of the Protestant cemetery by the Porta S. Paolo by cutting a broad straight street across it, or by other means.

"The municipal authorities proposed in 1887 (and the State sanctioned) a scheme for improving the traffic at the Porta S. Paolo. The necessity for this scheme was evident, because an industrial quarter of some importance had sprung up outside the gate, and the population of the suburb crossed by the Via Ostiensis had quadrupled since 1870. Here is a rough sketch of the scheme [*see plan*]. The traffic between city and suburb had to be carried through a (double) gate, only 9 ft. wide, the next gate on the left (S. Sebastiano) being 1,795 yards distant.

"The city proposed to open two avenues—one from the Marmorata side, one from the S. Gregorio side, which would meet at the gate. Here they would form a square about 250 × 250 ft., in the middle of which, and surrounded by old pines and cypresses, would stand the pyramid of Cestius, the double gate of Honorius, the postern of the Jubilees and Aurelian's wall connecting the pyramid with the gate—a monumental and historical group of incomparable beauty and interest.

"The scheme necessitated on the other side two little losses—the cutting of a passage through the walls on either side of the monumental group, and the removal to a safe distance of three tombs which stand at the easternmost extremity of the Protestant cemetery, next to the pyramid of Cestius.

"The removal of the three tombs to a little distance from their present place was duly arranged between the municipality and the (German, I believe) Embassy, which represented in this case the joint interests of the foreign colony.

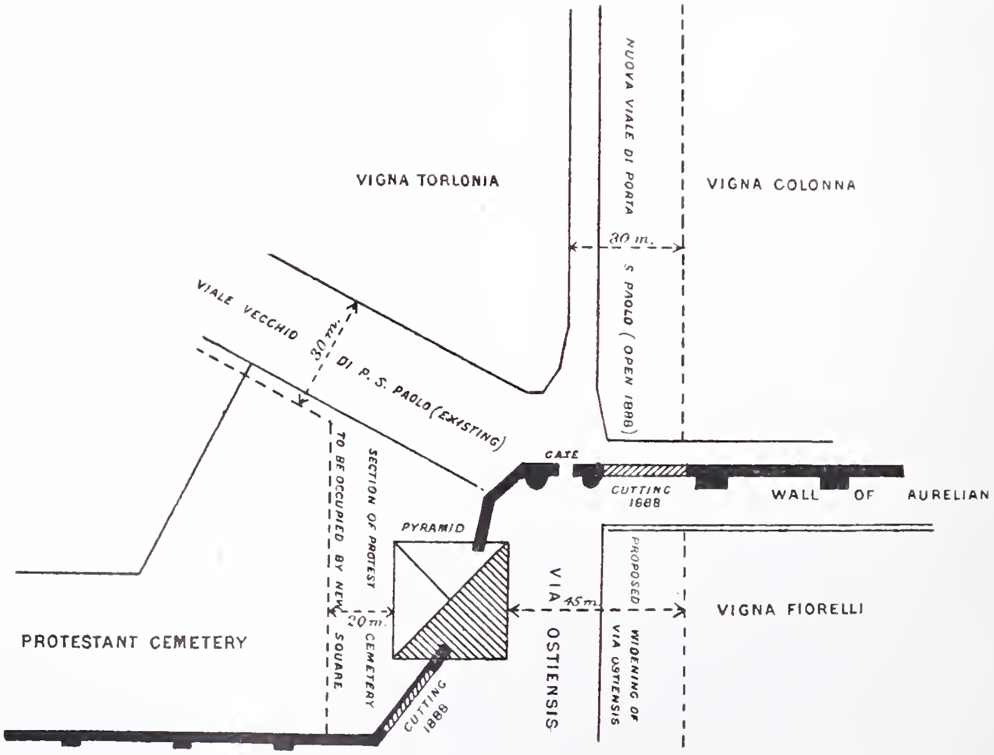
"The crisis of 1888 has left the scheme unfinished; the two avenues have been opened, the walls have been cut, but the transportation of the tombs and the general arrangement of the square are still to be carried into execution. Considering the present state of affairs, I suppose that many years will pass before this part of the *piano regolatore* will be taken up again.

"No other streets or roads are contemplated in the neighbourhood of the cemetery. This cemetery forms a parallelogram 286 yards long, 42 yards wide = 12,000 sq. yards. The section which will be eventually cut off for the purpose described above measures about 42 × 20 = about 800 sq. yards.—Believe me, truly yours,

"Prof. Rodolfo Lanciani."

A postcard from Professor Lanciani, dated the 29th Nov., continues:

"Let me add to my declaration of yesterday


VIGNA TORLONIA
NUOVA VIALE DI PORTA S PAOLO (OPEN 1888)
VIGNA COLONNA
30 m.
VIALE VECCHIO DI P. S. PAOLO (EXISTING)
30 m.
GATE
CUTTING 1888
WALL OF AURELIAN
PYRAMID
SECTION OF PROTEST CEMETERY
TO BE OCCUPIED BY NEW SQUARE
20 m.
45 m.
VIA OSTIENSIS
PROPOSED WIDENING OF VIA OSTIENSIS
VIGNA FIORELLI
PROTESTANT CEMETERY
CUTTING 1888

PLAN SENT BY PROFESSOR LANCIANI.

two other statements. 1st, That in the convention of 1888 it was agreed that the tomb of Keats and the two others should not be removed at all. They will continue to stand where they are at present, shaded by the same trees. 2ndly, That the sole representative of foreign interests in the Protestant cemetery by the pyramid of Cestius is the German Embassy. The English and American colony is simply allowed to make use of the cemetery by its legal owner, the German Embassy. R. LANCIANI."

Mr. Tavenor Perry writes:—

" 25, The Grove, Boltons, S.W.: 3rd Dec. 1898.

"DEAR MR. LOCKE,—Herewith I return Professor Lanciani's letter, and am much obliged to you for lending it to me. The Professor's apology does not seem to me to be quite satisfactory, and I would suggest that his plan should be published in our JOURNAL, to elicit the criticism of some of our members best acquainted with this quarter of Rome. For the widening of the roads, &c. on the east side of the pyramid already accomplished the increase of traffic may be a reasonable excuse, but for the new road on the west side there is no excuse to be found whatever, as the road would turn almost at right angles out of the Marmorata and lead to nowhere when outside the walls. The main idea seems to be to 'open up' the group of buildings composed of the P. Ostiensis and the tomb of Caius Cestius much as other unfortunate ruins in Rome have been opened up to their utter spoiling, such as the Minerva Medica, the Auditorium of Mæcenas, and many others. The effect which will result from this can be seen in Plate 5 of Parker's *Tombs In and Near Rome*, which is evidently a photograph taken from under the trees, and shows absolutely the appearance which will be presented by the tomb towards the new road. On page 22 of Wey's *Rome*, English translation, is a view showing the pines and cypresses which will have to be sacrificed to allow of this so-called improvement. The loss that Rome has sustained of late years from the reckless way in which trees have been wantonly destroyed can be well appreciated by reading the Professor's own remarks on this subject in his *Ruins of Ancient Rome*, page 418, and seeing the view he there publishes of a group of pines in the Villa Ludovisi, cut down in 1887.

" We may all feel strongly on the sentimental side of the question—the fact that the cemetery to be in part destroyed is mainly English, and among the tombs to be disturbed are those of Keats and Bell—and for these reasons our objections may be regarded as prejudiced; but all architects and artists will agree that a grave blunder would be perpetrated if, for the sake of some fancied improvement, one of the most picturesque corners of Rome were destroyed and valuable monuments endangered; and it is a scheme against which our Institute should most strongly protest.—Faithfully yours, J. TAVENOR PERRY."

Protection of Florentine Monuments.

The petition issuing from the Society for the Protection of Old Florence, to which attention has been called in the current volume of the JOURNAL [p. 48], has been signed by a great number of architects both in London and in the provinces, copies having been sent to the Hon. Secretaries of the Allied Societies. It still lies at the Institute for signature, but it must be sent in to the Society by the 24th inst.

A courteous letter from the Marchese Torrigiani, Syndic of Florence, appears in *The Times* of 15th December, protesting against the suspicions implied, and stating that neither the Ponte Vecchio nor the houses on it have been threatened at all. The only changes contemplated were the sanitation of the slums between Borgo San Jacopo, Sdruccioli dei Pitti, Via Maggio, and Via Guicciardini, and the building of a short colonnade between Pieta Rossa and Piazza san Biagio, being " merely the end of the work of resanitation of the part of the city formerly called the *centro*."

The same issue of *The Times* contains a counterblast by " Vernon Lee," who is in charge of the English and American petition. She refers to the vandalism of the commune in the demolition of the slums of the *centro* some years ago, and points out that the Marchese Torrigiani cannot bind the syndics who follow him, the office being temporary; and that, even if he could, the votes of the citizens could easily overpower their authority, as they did that of Prince Corsini, who was syndic during the demolition of the *centro*. " Vernon Lee " therefore urges sustained efforts on the part of lovers of old Florence, in spite of the syndic's protest.

Professor Ussing's Pamphlet on Vitruvius.

A translation, supervised by the author, of Dr J. L. Ussing's *Observations on Vitruvii de Architectura Libri Decem, with special regard to the time at which the work was written*, has been printed by the Institute, and is now on sale at the price of 2*s.* 6*d.* There is a special note on the cover to the effect that the Council, while thinking it desirable to print this translation, take no responsibility for the conclusions arrived at. An article on Professor Ussing's pamphlet by Professor G. Baldwin Brown [*H.A.*] will, it is hoped, appear in the next issue of the JOURNAL.

Memorial to the late Charles Garnier.

The following letter has been received by the Secretary from the Société Centrale des Architectes Français:—

Paris, le 22 novembre 1898.

MONSIEUR,—Le Comité constitué pour élever un monument à la mémoire de Charles Garnier, s'est réuni à l'Opéra, le samedi 5 novembre.

Dans cette séance, il a constitué son bureau de la manière suivante :

MM. Georges Leygues, ministre de l'Instruction publique et des Beaux-Arts, président d'honneur ; Alfred Normand, membre de l'Institut, président de la Société centrale des Architectes français, président ; Henry Roujon, directeur des Beaux-Arts, et Francisque Sarcey, homme de lettres, vice-présidents ; Gustave Larroumet, membre de l'Institut, secrétaire perpétuel de l'Académie des Beaux-Arts, secrétaire ; Bartaumieux, trésorier de la Société centrale des Architectes français, trésorier.

Le Comité a décidé que le monument serait élevé dans l'enceinte de l'Opéra sur la façade latérale, côté de la rue Auber, où se trouve la bibliothèque. L'architecte désigné est M. J.-L. Pascal, membre de l'Institut.

M. le Directeur des Beaux-Arts a donné spontanément au Comité l'assurance que le concours de l'État ne ferait pas défaut à son œuvre. De leur côté, MM. les directeurs de l'Opéra, pour associer étroitement leur théâtre, son public et ses habitués, à l'hommage que va recevoir la mémoire de Charles Garnier, ont décidé, d'accord avec MM. Paul Vidal, Emile Bergerat et Sainte-Croix, que le produit de la répétition générale payante de Gautier d'Aquitaine serait attribué à la souscription.

Mais, en raison des frais considérables qu'exigera un monument digne d'un tel objet et de l'emplacement choisi, le Comité compte principalement sur le résultat des souscriptions individuelles. Il a la ferme confiance que les confrères et les amis de Charles Garnier tiendront à honneur de réunir leurs efforts, afin d'attester leur admiration et leur affection pour le grand architecte.

Le Comité a donc l'honneur de vous adresser ci-jointe une liste de souscription et vous prie de la retourner, avec le montant des sommes recueillies, à M. Bartaumieux, trésorier, rue la Boëtie, 66.

En outre, les souscriptions individuelles sont reçues à Paris :

A la Société centrale des Architectes français, 168, boulevard Saint-Germain.

Chez M. Bartaumieux, trésorier du Comité, 66, rue La Boëtie.

A la librairie Hachette et C^ie^, 79, boulevard Saint-Germain.

A la caisse du théâtre national de l'Opéra.

Veuillez agréer, Monsieur, l'assurance de nos sentiments les plus distingués.

Le Président du Comité,
Membre de l'Institut,
Président de la Société centrale
des Architectes français,
ALFRED NORMAND.

Le Secrétaire du Comité,
Membre de l'Institut,
Secrétaire perpétuel de l'Academie
des Beaux-Arts,
GUSTAVE LARROUMET.

The Committee is a numerous and very representative one, composed of eminent Frenchmen distinguished in letters, science, or the arts. The only non-Frenchman on the committee is the President of the Royal Institute of British Architects.

The President last Monday announced that the Council had voted £10 to the memorial, and that he would be happy to receive further contributions and forward them to the Committee in Paris.

MINUTES. IV.

At the Fourth General Meeting of the Session, held Monday, 19th December 1898, the President, Professor Aitchison, R.A., in the chair, with 20 Fellows (including 10 members of the Council), 27 Associates (including one member of the Council), and several visitors, the minutes of the Meeting held Monday, 5th December 1898 [p. 80], were taken as read and signed as correct.

The following members attending for the first time since their election were formally admitted and signed the respective registers—namely, Henry Thomas Hare, *Fellow*, and Percival Cherry Blow, Arthur William Vercoe, and Christopher William Surrey, *Associates*.

The decease was announced of Henry Bridgford, of Manchester, *Fellow*, and of Professor Thomas Hayter Lewis, *Fellow*. Reference having been made to Professor Hayter Lewis's long and intimate connection with the Institute, to his high personal qualities, and to his services as Professor of Architecture at University College, on the motion of the President, seconded by Mr. John Slater [*F.*], B.A. Lond., it was

> RESOLVED, that the Royal Institute of British Architects desires to express its high estimate of the valuable and productive labours of its late distinguished Fellow, Professor Thomas Hayter Lewis, in furtherance of the advancement of architecture, and of the eminent services he rendered the Institute as Member, as Honorary Secretary, and as Vice-President; and that the Institute do record its sense of sorrowful regret at the loss it has sustained by his death, and do offer to his family an expression of sympathy and condolence with them in their bereavement.

The following candidates for membership, found by the Council to be eligible and qualified according to the Charter and by-laws, and admitted by them to candidature, were recommended for election—namely, As FELLOWS, George Hornblower [*A.*, qualified 1888] and Henry Hoyne Fox [*A.*, qualified 1887]; as ASSOCIATE, John Alfred Jones, jun. [*Assoc.* 1888–92].

The President announced that the Council had voted the sum of £10 to the fund which was being raised for the memorial to the late M. Charles Garnier.

Two Papers—namely (1) SOME PRACTICAL HINTS ON THE PRODUCTION AND USE OF ELECTRICITY FOR LIGHTING COUNTRY HOUSES, by Bernard M. Drake, M.I.E.E., and (2) PRACTICAL APPLICATIONS OF ELECTRICAL POWER, by H. R. J. Burstall, M.Inst.C.E.—having been read by their respective authors and illustrated by lantern slides and an exhibition of fittings and appliances, a discussion ensued, and a vote of thanks was passed to the authors by acclamation.

The proceedings then terminated, and the Meeting separated at 10.20 p.m.

Obituary.—Notice has just come to hand of the death of Mr. Thomas Lainson, of Brighton, which occurred on the 18th May last. Mr. Lainson had been a Fellow since 1877.

THE BIRMINGHAM MEETING AND ANNUAL DINNER.

The first item in the programme of the Birmingham meeting on Friday, the 9th December, was the inspection of the new General Hospital. In the absence of Mr. Henman, who had counted upon conducting parties over the building, the Governor of the Hospital, Dr. Way, explained the arrangements to a large number of London and non-Birmingham architects.

At 5 o'clock, Mr. W. M. Fawcett, Vice-President, taking the place of the President, who was most unfortunately prevented by illness from attending the meeting, held a reception at the rooms of the Society of Artists, kindly placed at the disposal of the Institute. After the reception a general meeting was held, at which the following paper was read:—

BUILDING BY-LAWS AND THEIR ADMINISTRATION.

By William Henman [*F.*].

Before entering upon the subject of "Building By-laws and their Administration," respecting which I have been requested to make a few remarks preliminary to the discussion which it is hoped may follow, permit me to express my satisfaction that the Institute has determined to hold such gatherings as this from time to time at the centre of one or other of the Allied Societies, and to offer on behalf of the Birmingham Architectural Association a hearty welcome to all who have come to take part in this meeting.

It seems to me most appropriate that at these business meetings held in the provinces, subjects which principally affect the daily work and status of architects practising outside the Metropolitan area should receive consideration. Time at disposal would be too short for full discussion of subjects connected with the higher branches of our art, and is in fact barely sufficient to give even a general idea of the difficulties surrounding a subject such as I have to bring to your notice; but it may, I trust, be enough to indicate the widespread feeling that building by-laws and their administration throughout the country are in a most unsatisfactory condition. Unless members of our profession can bring united pressure to bear upon the responsible authorities, the evils under which we have so long suffered may extend, and cause in the future still greater annoyance and irritation to architects, as well as injury and loss to the public.

It will be understood from the foregoing that the Metropolis is purposely excluded from present consideration, the reason being that the Building Act applying thereto has recently been revised, and because it is administered by an experienced body of men, who, I believe, are generally architects or have had an architectural training, in addition to which there is power of appeal to the London County Council.

I pronounce no opinion, therefore, either upon the new Metropolitan Building Act, or upon its administration, but desire to direct attention to the fact that outside the operation of that Act an entirely different state of affairs exists.

Under the Public Health Act of 1875 district authorities are empowered to make by-laws and building regulations subject to the approval of the Local Government Board. Some latitude in a few special particulars to meet local requirements may be necessary and advisable; but when every district authority is allowed to make all sorts of petty variations, confusion results, and architects who have works to carry out in several, perchance adjoining, districts are often caused the greatest annoyance and inconvenience by having plans disapproved in one district which would be passed without question in another; and this frequently results from the interpretation different surveyors may put upon the same by-law or regulation. Some local authorities make regulations simply by resolution of the board, which they do not even print or circulate, and endeavour to enforce observance thereof without having secured the approval of the Local Government Board.

It may, I hope, be taken for granted that architects as a body have not the slightest desire to evade or obstruct any by-law, or even any regulation lawfully made with the object of securing safety and health, provided such by-law or regulation is uniformly and reasonably enforced.

Most of the difficulties, annoyances, and petty irritations principally arise because those in authority too often lose sight of the one and only object for which building by-laws and regulations are necessary, viz. to secure safety and health to individuals and communities.

The so-called Model By-laws of the Local Government Board were doubtless framed with that object, but they are confused in arrangement; they go too much into detail on matters of minor importance, respecting which knowledge is yet imperfect, and omit reference to matters of structural importance, the neglect of which in some buildings may be a definite source of danger. Moreover, they are wrapped up in a vast amount of unnecessary legal jargon and excessive verbiage.

On these really far from model by-laws, those of district authorities are framed, but each with numerous variations even in neighbouring districts; reference to any particular subject is rarely assisted by suitable headings, marginal notes, or index. Special Acts of Parliament, promoted by local authorities for entirely different purposes, frequently have clauses slipped into them which either extend or repeal portions of building by-laws previously in force, and it rarely happens that such provisions are properly set forth in the printed matter issued as the Building By-laws of the district. All this is bad enough, but difficulties are increased by the uncertain methods of administration.

Apart from the larger cities, provincial district surveyors are usually selected from a class of men trained to road surveying and sewer laying, with little knowledge of building construction, and less of architectural propriety. Brought up in the offices of district surveyors, they appear to imbibe the idea that architects are their natural enemies, and that their duty consists in devising means for wasting their time and causing them unnecessary trouble, quite regardless whether by so doing the safety or health of any individual may be secured.

In populous districts the surveyors are assisted by building inspectors, with, as a rule, even less knowledge and discretion. So that instead of inspection and regulation, such as I take it the law intended, there is frequent dictation and undue interference.

One class of property, for which well-devised building regulations are required, viz., dwellings for the working classes, are still erected in the most flimsy fashion by the jerry-builder, who generally goes scot-free, while architects who desire to build scientifically and well are continually harassed by unreasonable restrictions and requirements under cover of a questionable by-law.

The reason for this is not far to seek—too many members of district councils are interested directly or indirectly in building operations; the surveyor can serve such in many ways, and in turn obtains their support. Inspectors are but mortal, and generally underpaid; it is therefore not surprising that some of them come under the influence of the speculative builder. Little credit accrues to them by drawing attention to his irregularities, but *éclat* is gained when an architect is reported as having contravened, even the letter of a by-law or regulation.

Strange to say, the architect has no redress whatever; the surveyor is all potent; for even if the committee are permitted to be approached, they generally support the action of their surveyor, and the Local Government Board proclaim their inability to interfere. Resistance to unreasonable demands simply engenders greater exactions, so that, more often than not, architects give way simply for the sake of peace and quietness.

Another side of the question, particularly in large towns and cities, seriously affects every class of the community. Year by year district authorities are grasping at greater powers of control, ostensibly for the public good. Local Acts are slipped through Parliament. By-laws and regulations are made, many of which seriously trench on the rights of property and of individuals, or by which the cost of building is seriously and unnecessarily enhanced.

In order to counteract these evils, members of our profession must act together, and strive to obtain the co-operation of building proprietors by letting it be known through the public press that action is being taken, in the hope of regulating local authorities and their officials within reasonable limits. Pressure must also be brought to bear upon the Local Government Board, so that Building By-laws may in all essentials be uniform, and that only such regulations may be sanctioned as are proved to be necessary to secure health and safety. In addition to this, courts of appeal, easily accessible, should be constituted.

Although but indirectly connected with our subject, I take this opportunity to draw attention to the employment of district surveyors in carrying out buildings of architectural character, such as infectious hospitals, baths, libraries, markets, and even town halls and council houses. Rarely have they received suitable training to fit them for undertaking such works, and in doing so architects are deprived of legitimate employment for which many of them have spent years of study and gained practical experience.

Why district surveyors should be so anxious to undertake the carrying out of work additional to their ordinary duties may at first sight appear unaccountable, but I have had opportunities for watching the process, and seen the results.

As previously mentioned, a surveyor often makes himself useful to members of his board; then when a building is required, it is suggested that an architect's fees may be saved by employing a salaried servant—this appears so plausible to the average district councillor that it is not surprising the surveyor is entrusted with the work. He then obtains the services of some architectural hack, who prepares the design. The work proceeds. Mr. Surveyor then suggests that, in consequence of the labour involved, he should receive extra remuneration, which generally takes the form of a rise in his salary, and often the "temporary" hack becomes a permanent addition to his staff; so that the ratepayers, instead of simply having to pay an architect the usual five per cent. on the cost of the work, are saddled with an annual charge, which in the aggregate largely exceeds the legitimate fees for the carrying out of the work. In addition to which it is a well known fact that the actual outlay on buildings carried out under the control of surveyors generally is far in excess of what it would be in the hands of a qualified architect, so that not only do members of our profession suffer, but the public have to bear the excessive cost, and the buildings lack architectural character and usefulness.

In some districts surveyors are permitted to undertake private work. They prepare designs in the public offices with the assistance of their staff; necessarily those designs are passed without question; and I have even heard of difficulties being thrown in the way of building proprietors and architects, evidently for the purpose of diverting work into the hands of the surveyor.

These are crying evils, which it is to be hoped the Institute will take up and exert itself to remedy; it is one way in which it may demonstrate its power for the good of the profession and benefit the public. Such useful action is, in my opinion, the best means to adopt for the extension of its influence, and the increase of its membership throughout the country.

DISCUSSION ON MR. HENMAN'S PAPER.

Mr. WILLIAM WOODWARD [*A.*], said that the difficulties Mr. Henman spoke of with regard to building by-laws and their interpretation were applicable equally to London. In London, however, there existed a Tribunal of Appeal, consisting of two architects and a lawyer, empowered to deal with questions arising under the London Building Act.

Mr. T. NADEN said that in Birmingham their appeal was to a committee of the Council. He had experienced no difficulty with surveyors. They had only to stroke the surveyor the right way to get what they wanted, and the committee need only be appealed to when the surveyor considered that the by-laws were not sufficiently elastic to meet a special case, and could not take the responsibility upon himself.

Mr. J. C. NICOL [*A.*] said that in his personal experience the surveyors were not so very bad to deal with. The architect, if he went about it the right way, generally got his own way in the end.

Mr. W. MILBURN said that in Sunderland they had a set of unsuitable by-laws, framed by the Corporation, and the architects got up an agitation, in which they obtained the assistance not only of the builders, but of the leaders of the workmen's societies. The result was that they got the by-laws amended.

Mr. JOHN COTTON [*F.*] said the subject of Building By-laws—which were the rules and regulations under which they as architects largely worked—was a most important one for consideration, and Mr. Henman was to be thanked for bringing it forward. He could not, however, quite agree, if he interpreted the paper aright as applying generally, that it was desirable for exactly the same rules to prevail in country towns as in large towns and cities, where the conditions were different, and where, of course, there was liability to greater disaster from fire. By-laws should vary to suit varying local conditions and sites, and be adaptable to brick, stone, or timber districts, for instance, and to the class of building proposed to be erected. Laws which might be well enforced in the case of large and important town structures would be excessive and prohibitory in the case of country cottages. As architects they would agree with him that the great charm of our country towns was the picturesque irregularity and diversity which existed; caused by bay and oriel windows, overhung gables, and such-like projections, and the introduction of timberwork. The charm of these features the by-laws enforced in many country towns would tend to prevent, with the result that in time our country towns would have their streets flattened out in the utterly dreary and monotonous manner of those in suburban Birmingham and Manchester. This they, as presumed lovers of their country and of the beautiful and picturesque, should protest against and strive to obviate. The solitary architects in country towns could of themselves do little or nothing against this levelling and forbidding system, often sanctioned unwittingly by urban councils adopting by-laws without due consideration, or on the recommendation of a sanitary surveyor oblivious of everything except smells. He would suggest that provincial architectural associations should call into consultation with them the architects and surveyors from surrounding districts with a view to promoting an agreement as to what by-laws were most appropriate to such country districts. Perhaps, as uniformity was desirable in such laws as far as possible, and not difficult in essentials to obtain, each county or group of counties similarly circumstanced could have its particular code. This would prevent every little town having its own special variety, to the confusion of architects and builders. He quite agreed, though, that in the case of large cities like Birmingham and its *connected* suburbs one code of by-laws should rule, as small variations were unnecessary and troublesome.

Mr. P. GORDON SMITH [*F.*] said that, Birmingham having special powers under the Consolidation Act, the suburban districts could not exactly copy its by-laws. He thought, however, that it would be a very great advantage if all the local authorities in the neighbourhood would meet in Birmingham and form a committee to go into the whole subject, with the view of framing a uniform code of by-laws. They might, perhaps, get the assistance of some one from the Local Government Board to point out to them what they could or could not do. He was sure that the representatives of such a conference would receive the utmost consideration from the Local Government Board. As to the "regulations" of which complaint had been made, a district council could make what regulations it liked, but it could not enforce them. There was no penalty. As for the Model By-laws, the Local Government Board could not compel the adoption of any one of them. These by-laws had stood the test of the courts very well, but if their phraseology were obscure there was no objection to the local authority printing explanations or illustrations with them. As for the surveyors, he had found them excellent officers and very amenable to reason. In many of the large towns the surveyors were splendid men.

The Chairman thought it desirable that the Birmingham architects should take a leaf from the book of their Sunderland colleagues.

Mr. J. Smith (Sheffield) said that in his town work to the amount of a million and a quarter was being done from the surveyor's office.

A Member suggested that if they took this point up they would be open to the accusation of thinking about their personal interests rather than the public good.

Mr. A. E. Sawday [*F.*], President of the Leicester Society, thought they need not be too thin-skinned on this question. It had been taken up in Leicester, and as the result of representations to the Town Council a resolution had been passed by that body that for all architectural work over a certain amount an independent architect should be engaged.

On the motion of the Chairman, the following resolution was unanimously adopted:—

> "That the Institute is in sympathy with the action that is being taken by the Birmingham Architectural Association as to the framing and administration of by-laws in Birmingham and the surrounding district, and will be very pleased to assist the local society by advice or suggestion in their action."

Mr. Wm. Henman writes in a letter to the Secretary dated 15th December:—

"Unfortunately I was detained in London on the 9th inst., and could not be present at the meeting at Birmingham when my paper on Building By-laws was read, and therefore could not reply to the discussion thereon.

"In the first place, it is unfortunate that in the circular sent out it was stated that my paper would deal with the Birmingham by-laws, whereas I dealt with *all* provincial by-laws; because the object I had was to direct the attention of the Council of the Institute and of all Allied Societies to their defects, in the hope that the subject would be taken up collectively, so as to bring united influence to bear upon authorities with a view to securing greater uniformity and reasonableness therein and in their administration.

"The plea put forth by some speakers that if surveyors were properly approached and 'stroked the right way' architects would generally get what they wanted, is to my mind extremely objectionable. Why should architects have to toady to district surveyors? If by-laws were reasonably framed and administered there should be no occasion for it.

"Although the resolution adopted is so far satisfactory, it would have been better had it been more general in its application, so that the Council of the Institute and of all Allied Societies would have felt bound to take united action. I am glad to learn that Mr. Lacy W. Ridge will bring forward resolutions, *re* Building By-laws of Rural Districts, at the next business meeting of the Institute; but I should have preferred to find that the whole subject of provincial by-laws and their administration was to be taken in hand.

"It was fortunate that Mr. P. Gordon Smith, architect to the Local Government Board, was at the meeting, and comforting to find he stated that 'regulations' of district councils could not be enforced. I willingly give credit to many district surveyors for the admirable work they do, but there are exceptions, and some, undoubtedly, err on the side of excessive zeal. The action of the Sunderland architects is worthy of imitation, and indicates that united action would be even more effective."

⁂ London members will have an opportunity of expressing their views on some of the points discussed by Mr. Henman at the Business Meeting of the 16th January, when Mr. Lacy W. Ridge [*F.*] has given notice that he will move a series of Resolutions on Local Building By-laws in rural districts. The Resolutions are printed in the *Supplement* to this issue.

THE DINNER.

A gathering of ninety-seven assembled at the Grand Hotel at 7.30, and were there received by Mr. H. L. Florence, Vice-President, who afterwards took the chair at the dinner. Among the guests of the Institute and the Association were the Lord Mayor and the Deputy Lord Mayor of Birmingham, Sir Benjamin Stone, M.P., Sir James Sawyer, Mr. J. Powell Williams, M.P., Mr. Wm. Kenrick, M.P., Mr. J. T. Middlemore, and other gentlemen officially connected with Birmingham institutions. From various expressions of opinion that have been received it seems that the gathering was in every way successful. Subjoined is a complete list of those present, and a report of the speeches.

Mr. De Lacy Aherne; Mr. F. E. F. Bailey [*A.*]; Mr. David Barclay, President of the Glasgow Institute; Mr. C. E. Bateman [*F.*], President of the Birmingham A.A.; Mr. R. I. Bennett [*F.*], President of the Manchester Society; Mr. E. C. Bewlay; Mr. W. H. Bidlake [*A.*]; Mr. E. J. Bigwood, Secretary of the Builders' Association; The Right Hon. the Lord Mayor of Birmingham; Mr. E. Boardman [*F.*]; Mr. John Bowen, President of the Birmingham Master Builders' Association; Mr. B. Bower; Mr. H. T. Buckland; Mr. J. T. Bunce, Chairman of Committee of Management of the Birmingham School of Art; Mr. E. Butler; Mr. G. H. V. Cale; Mr. J. H. Cartland, High Sheriff of Worcestershire; Mr. P. B. Chatwin; Mr. A. E. Cheatle; Mr. T. E. Collcutt [*F.*]; Mr. Thomas Cooper [*A.*]; Mr. George Corson, President of the Leeds and Yorkshire

Society; Mr. John Cotton [*F.*]; Mr. G. A. Cox; Mr. J. A. Crouch; Mr. W. Derry; Mr. W. Doubleday; Mr. A. Edwards; Mr. John Ely [*F.*]; Mr. W. Emerson, *Hon. Secretary R.I.B.A.*; Mr. Oliver Essex [*F.*]; Mr. W. M. Fawcett, *Vice-President R.I.B.A.*; Mr. H. L. Florence, *Vice-President R.I.B.A.*; Mr. Ernest George, *Vice-President R.I.B.A.*; Mr. E. M. Gibbs [*F.*]; Mr. J. Goodacre [*F.*]; Mr. J. Goodman; Mr. E. A. Gruning, *Vice-President R.I.B.A.*; Mr. H. B. Guest; Mr. A. Hale [*A.*]; Mr. Wm. Hale [*F.*]; Mr. Ewen Harper; Mr. J. A. Harper; Mr. A. Harrison; Mr. Stockdale Harrison [*F.*]; Mr. R. S. Heath, Principal of Mason College; Mr. William Henman [*F.*]; Mr. G. H. Hunt [*F.*]; Mr. Wm. Kenrick, M.P.; Mr. H. R. Lloyd [*A.*], Vice-President of the Birmingham A.A.; Mr. W. H. Lloyd; Mr. W. J. Locke, *Secretary R.I.B.A.*; Mr. A. R. Lynex; Rev. E. F. M. McCarthy, Chairman of the Birmingham School Board; Mr. H. H. McConnal [*A.*]; Mr. A. E. McKewan [*A.*], Hon. Secretary of the Birmingham A.A.; Mr. F. W. Martin; Mr. John T. Middlemore; Mr. T. R. Milburn [*A.*]; Mr. W. Milburn; Mr. Thomas Naden; Mr. T. W. F. Newton; Mr. G. S. Nicol; Mr. J. C. Nicol [*A.*]; Mr. Paul Ogden [*F.*]; Mr. J. B. Orwin; Mr. Owen P. Parsons and guest; Mr. S. Perkins Peck [*A.*]; Mr. A. R. Phipson [*F.*]; Mr. Jonathan Pratt, Secretary of the Society of Artists; Mr. W. J. Price, City Surveyor, Birmingham; Mr. E. F. Reynolds; Mr. W. A. Royle [*F.*]; Dr. Saundby, President of the Medical Institute; Mr. A. E. Sawday [*F.*], President of the Leicester Society of Architects; Sir James Sawyer; Mr. H. D. Searles-Wood [*F.*]; Mr. A. Short; Mr. C. Silk, Hon. Secretary of the Birmingham A.A.; Mr. John Slater [*F.*]; Sir James Smith, Deputy Lord Mayor of Birmingham; Mr. J. Smith; Mr. P. Gordon Smith [*F.*]; Mr. H. Heathcote Statham [*F.*]; Sir Benjamin Stone, M.P.; Mr. E. R. Taylor, Head Master of the School of Art; Mr. H. H. Thomson [*A.*]; The Rev. A. R. Vardy, Head Master of King Edward's School; Mr. John Ward; Mr. Aston Webb [*F.*], F.S.A.; Mr. J. Powell Williams, M.P.; Mr. Wm. Woodward [*A.*], and representatives of the Press.

The usual loyal toasts having been honoured,—

Sir James Smith proposed "The Houses of Parliament." Every one, he said, especially those who did not live in London, took a pride in the Houses of Parliament, and agreed that the buildings were such as the nation could be justly proud of. It was a curious coincidence that the best public building in Birmingham, viz., King Edward's Grammar School, in New Street, was also designed by Barry, the architect of the Parliament Houses. He was afraid Birmingham could not boast of many buildings of the same merit as this. Birmingham was rather a city of manufacturers, and there was not much scope for architectural beauty in building factories, especially when all wanted their factories as large as possible for the smallest amount of money. In taking a stranger round Birmingham to show him the public buildings a start should be made at the Grammar School. Then, if the visitor could be got to keep his eyes shut until the Town Hall was reached, a good impression would be produced, for the Town Hall, both inside and out, was a building of which Birmingham folk were not ashamed. Some of the modern buildings, such as Mason College, the Victoria Courts, and the new General Hospital, did the city credit. The City Corporation recently had offered to them by Mr. J. T. Middlemore, one of Birmingham's most generous citizens, some very valuable pictures on condition that the Corporation should build a new Art Gallery. If this offer were accepted by the City Council he hoped Birmingham would have a new Art Gallery worthy of the pictures it would contain, but he recognised that the erection of the proposed new gallery would not be without its difficulties. It must be connected to the present municipal buildings by a bridge across a street, and he feared that an angel—much less an architect—would be puzzled to give them all that they wanted. To design this bridge so that it would be in character with the new building and also in keeping with the old, would not be an easy matter. The bridge must be as light and beautiful as a dream, and yet be substantial enough to take six aldermen abreast. He was glad to see that the "severe order of architecture," as Mr. Morris called it, was dying out, and that buildings with cemented fronts were not now being erected. The fashion in architecture was always changing. To-day it seemed to be the reign of terra-cotta, and those who were having new buildings erected at the present time might feel as confident that terra-cotta materials would be used as that there would be extras on the architect's specification. In all new public buildings it was desirable that there should be some endeavour to elevate the taste of those people who spent so much of their time in factories by showing them specimens of architecture which would have an ennobling influence. In London, of course, they would always find the best buildings. Every agency, every insurance company, every bank, must be represented there by an imposing architectural structure. The theatres erected in London during the last few years alone were almost a school of study in themselves, and in his opinion the only public buildings in London which were absolutely out of date were the railway stations. With one exception the London railway stations were very ugly, and most of them devoid of any beauty at all. If only the members of the Royal Institute of British Architects had a free hand—and of course railway companies would not carp at a few extras—what a transformation they could make!

Mr. Powell Williams, M.P., in response, said the Houses of Parliament were impressive, stately, and appropriate, notwithstanding the insignificant fact that the Second Chamber was not at all capable of holding the persons for whose accommodation it was intended. That, perhaps, did not matter very much, because he had not himself observed, except on very special occasions, any particular eagerness on the part of the peers to be present in their places. There was something about the Houses of Parliament themselves which showed on the part of the man who designed them a real genius for his profession, and it was sometimes a matter for wonderment that their style and form were not more frequently copied. The exterior looked all tranquillity, and that was a considerable advantage considering what sometimes took place inside. Internally, the structure answered its purpose very well.

The Chairman, giving the "Corporation of Birmingham," said that as he travelled towards Birmingham that afternoon he was utterly at a loss what to say about its Lord Mayor and its Corporation, because Birmingham municipal life was a subject of which he was profoundly ignorant. But on reaching the suburbs of the city he looked out through the window for an inspiration, and saw a tall chimney and some smoke. These gave him what he thought would be a good subject. Architects regarded smoke as their most determined enemy, for it destroyed material, and form, and colour, only leaving proportion as a distinguishable feature, and proportion was, unfortunately, the feature in which architects were mostly deficient. As architects they were well accustomed to smoke. All great schemes began in smoke; some continued in smoke; and not a few ended in smoke; but no one could have failed to recognise that in the last few years great progress had been made by all municipal institutions. Wherever they went they could not fail to notice the magnificent buildings put up by the great provincial towns—greatly to the benefit of the architect's profession, many members of which were thereby enabled to make fame and, it was to be hoped, also fortune. On reaching Birmingham he perceived that the city was not enveloped in the dusky cloud he had expected, and his one topic for discussion was therefore taken from him. But during the short time he had been in Birmingham he had been surprised to see the magnificent scale on which public improvements were carried out. Their new street, for instance (Corporation Street), was carried through in a straight line without any of the awkward curves and corners and unexpected divergencies they met with in all the later so-called improvements in London. It was a very great thing to find a municipality carrying out such great improvements, and yet these improvements were in one sense not without their disadvantages, because, when one great scheme had been carried out, a still greater one was next demanded. With the greatly increased powers given to Municipal Corporations more was now expected from them—not only new thoroughfares and similar improvements, but pellucid rivers and stately embankments, and public buildings of palatial and sumptuous architectural design. All these they looked for in the future; but there were many other important works—the dwellings of the poor and the working classes, for instance, demanded not merely actual buildings, but buildings containing some element of art which should spread its ennobling and elevating influence on the minds and feelings of the greatest possible number.

The Lord Mayor of Birmingham, in responding, said that, although Birmingham could not always be engaged on magnificent buildings which afforded scope for the great leaders of the architectural profession, they were continually extending in the suburbs, and even in the centre of the city the renovations which were taking place must afford great opportunities for the rank and file of the architectural profession. They had done something for the profession by their extensions, but they were doing more for the profession in another direction. For the prosperity of the artistic professions it was essential that there should be a public capable of appreciating art, and the Corporation of Birmingham for some years past had been giving special attention to the education of their young people, so that they might become able to realise the beauties of architectural design. When they had been educated sufficiently the young people would be able, in a walk through the streets of Birmingham, to see every variety of architectural design—more or less embellished or disfigured by that smoke to which the Chairman had referred. With this great variety of architectural design it was no wonder that already, without waiting for the development of the critical faculties of the young people, they had a great variety of criticism, and this criticism came quite as much from the members of the architectural profession as from any other source. He could not assume that any of the architectural criticism arose from professional jealousy, and therefore he concluded that there was a wide diversity of opinion among architects at the present time as to what really was good, bad, or indifferent in architectural work. This led him to ask whether the rising generation of architects was taking advantage of all the possible opportunities in art education. To that question he did not know the answer, but it was quite certain that if they were not, and if the public were being educated in art at a greater rate than the members of the artistic professions, there would be something very much amiss in the future. Passing on to speak of the relations of municipal authorities with the architectural profession, the Lord Mayor said that, taken individually, the members of the Birmingham Corporation, for instance, were excellent men of business, but when they were taken collectively they often sacrificed business instincts for what they considered to be of greater importance—matters of principle; that was so particularly in regard to architectural matters, and he often felt that it would be wiser as a rule on the part of the Corporation to discuss architectural matters in the same way they would if they were acting as private individuals, and not to blindly insist on a competition, whatever the subject might happen to be. While recognising the advantages of competitions as a rule, he thought there were exceptions when they would break away from that rule and talk over with the architect any proposed new building, in the same way as they would if they were acting privately for themselves.

Mr. J. T. Bunce proposed "Architecture and the Kindred Arts." He asked his hearers to consider what a large and weighty subject his toast dealt with—Architecture, the oldest and most venerable of all the arts; the art which in its principles and in its visible form and in its developments from the age of the cave-dwellers to our own day, embodied and recorded the growth of civilisation and the history of human progress; the art which had not ineptly been described as "the printing press of all ages." Then the other part of the toast—the Kindred Arts; mainly the arts of sculpture and painting, with other forms of internal and external decoration. As to how important these were, and how closely they were related to architecture, there was the testimony of two eminent witnesses. M. Viollet-le-Duc said in his "Lectures on Art" that "sculpture and painting are to architecture what the drama and poetry are to music—its derivatives, its necessary complements." And Mr. Ruskin, speaking in his broader and stronger way, declared that "there are only two fine arts possible to the human race, sculpture and painting. What we call architecture is only the association of these in noble masses, or the placing them in fit places. All architecture other than this is, in fact, mere building." Speaking before so many masters of architecture, he would not venture to contest this dictum of Mr. Ruskin, nor attempt to trace the growth of architecture and its kindred arts in their infinite developments. The only course to be followed on that occasion was to relinquish a hopeless task and put aside such a tremendous theme. Not so very long ago Birmingham was an ugly town. Art was not unknown in the town, for Birmingham had produced some great painters and a fine succession of great engravers; the Society of Artists had kept steadily for many years a brilliant light; and there were in private hands several fine collections of pictures. But the community itself had done little for art in any form but that of music. Excepting the Town Hall there was no public building of distinction; the chief streets were narrow, ill-arranged, mean in their architecture—a poor, debased, sham classic being their main characteristic in this respect. Factories were hideous in their plainness, and but for a few examples of fine half-timber work—now unhappily mostly swept away by the so-called "march of improvement"—houses were devoid of taste in design, consisting, as a rule, of the familiar rectangular boxes punctured at intervals with holes to serve as doors and windows. Now, thanks to municipal spirit, to advancing education, and to the skill of later architects, they had broad and handsome streets, cut through once congested areas, and giving free play to light and air—streets which would bear comparison with the best in any town in the kingdom. Though Birmingham still possessed some public buildings of which Birmingham folk were not inordinately proud, there were others which showed a great measure of progress, such as the noble Parish Church of St. Martin, the Mason College, the School of Art, the Midland Institute, the new General Hospital, and the exquisitely graceful Victoria Courts, and they had also a singularly fine series of Board Schools. The newer factories and warehouses were, many of them, stately structures, the shops were often marked by artistic quality, and a large proportion of suburban dwellings erected within the last twenty-five years recalled the days when English domestic architecture was at its best and highest. He did not say that they had attained it, but in much of recent architecture architects and their clients had striven to work with the spirit of those great Italians, who, at a happy period, united the strictness and severity of Gothic with the richness and freedom of the early Renaissance. In not a few buildings, public and private, the aid of the kindred arts of sculpture and painting had been called in, the former freely, and, as to the latter, it was something to have enriched the Town Hall with mural pictures, and a great thing to possess the magnificent series of Burne-Jones windows in St. Philip's Church. Much more had been done than this. The education of the people, particularly in the artisan classes, in the principles and methods of true art, in the Museum and Art Gallery, and by the Municipal School of Art (which included an architectural school), had been attended with a large measure of success. These details of local progress merely touched the fringe of a great subject into which he could not more deeply go. He therefore gave the toast of "Architecture and the Kindred Arts." Architecture, impersonating her as the Mother of the Arts—recognising her majestic unity, and yet the grace of her infinite variety—placed between her handmaidens, Sculpture and Painting, inseparable from her as the complement of her structural designs and as the necessary enrichments of the royal robe she wears.

Mr. W. H. Bidlake [*A.*], responding, said that although the exclusive spirit of early times had passed away and a broader and more altruistic one had taken its place, architecture, if she were true to her traditions, would still express, as she had always expressed, the ideas and ideals of the times. In Birmingham the commercial and the municipal ideals were dominant, and he believed it was quite possible for architecture to express those ideals as well as to express the ideals of more classical periods. The municipality no doubt owed much to architecture, and architecture in turn owed much to that broad and enlightened municipal spirit which required not only that a building should be useful, but that it should also be beautiful.

Mr. J. T. Middlemore, replying to the same toast, said that art in England had much to congratulate itself upon: the multiplication of schools of art, the appreciation of what was really good in art, whether applied to buildings or to pictorial art, and the dissatisfaction generally felt with the pompous, the pretentious, and the unbecoming. The dignity of the calling of the artist had been raised enormously within the last half-century, and artists themselves would acknowledge that the emoluments of their art had been much increased. It would be interesting to hear some explanation of what produced good and great art amongst a community nowadays. The great mediæval art was produced by a great Christian inspiration, accompanied doubtless by a revival of learning, and an earnest and thoughtful outlook on life. A deep faith, no doubt, produced a great art, and the deeper the faith the higher would the aim and effort of the artist be to do justice and to give reality to his work. Looking at our own times, it seemed to him that the same mental and moral forces which produced Watts and Holman Hunt, Burne-Jones and Millais, also produced Coleridge and Wordsworth, Tennyson and Browning, Newman, Liddon, and Westcott, Carlyle and Froude, Sir Wm. Hamilton and J. S. Mill, George Eliot, Dickens, and Thackeray. A spiritual course aroused the energies of these great people, and without its influence those energies would have lain latent or only half aroused; but on the whole the nineteenth century had deserved well of its children intellectually, morally, and artistically. What of the twentieth century? To him it seemed that one of the most notable spiritual forces would arise from the intense desire that to all, even the poorest, every possible means of culture should be open to every man, and have a chance for the growth and development of his own nature. This intense desire had produced our present galleries, and libraries, and schools, and it would, he trusted, grow into a great formative inspiration, under the influence of which men might be less worldly and selfish, and life be simpler and nobler, and even art itself more sincere, more great, and more elevating.

Sir Benjamin Stone, M.P., proposed "The Royal Institute of British Architects," detailing his familiarity with all the great architectural works of the world, and declaring his high conception and exalted feeling for architecture and for the ennobling part it had played in the history of the world. All could not now be architects, but to architecture even the layman owed a duty, that duty of respecting and preserving the ruins of ancient architecture from the vandalism one met with every day—vandalism which was a disgrace to modern society. Only on the previous day he went into a church by chance, and found that a magnificent rood screen had been cut in two because the churchwarden wanted to put in some furniture. What surprised him more was that the same churchwarden had taken some miserere seats and chiselled off the grotesque figures underneath because he thought they verged on impropriety.

The Chairman, responding on behalf of the Institute, said that it would be a great pleasure for him to report to the President that their meeting in Birmingham had been so successful. The Royal Institute of British Architects existed for several purposes—for the advancement of the art of architecture, and for the protection of the architects themselves. By the great extensions it had recently made in connection with Allied Societies—now numbering no fewer than seventeen societies in different parts of England, and even extending to Australia—they had naturally increased their influence, and at the same time they had created a bond of brotherhood which they were anxious to sustain and keep. Speaking of the proposed University for Birmingham, Mr. Florence said that as the proposal had excited such a great deal of attention and interest, he thought it advisable to see what subjects had been specially taken up at the University. He was surprised to find that, in spite of the great influence of Sir Benjamin Stone, and all they had heard from the leading lights of the City, and from members of the City Council that night, architecture was not included in the scheme, and he was afraid that public interest in architecture was not quite so sincere or so enthusiastic as the proposer of the toast would wish it to be. As further illustration of this he would refer to another city, at least as well known as Birmingham, where, in public advertisements for an architect to be engaged in the superintendence of the construction of some great works, the architect was to rank the same as a tramway director. He would be put on the same level, and receive exactly the same salary. That, he was happy to say, was not in Birmingham.

Mr. W. M. Fawcett, *Vice-President*, gave "The Birmingham Architectural Association and the Allied Societies," and commended the Institute for having thrown open its arms and endeavoured as far as possible to join the country members with it in forming a mutual body for the representation of the profession, and for promoting the general good and maintaining the high standard of the profession.

Mr. C. E. Bateman [*F.*], President of the Birmingham Architectural Association, and Mr. R. I. Bennett [*F.*] (President of the Manchester Society of Architects) replied, the latter remarking that he was looking forward to the time when, by the aid of the examinations, their profession would be made as close as that of the law.

Mr. Aston Webb [*F.*] proposed "The Guests," and the Rev. A. R. Vardy having briefly replied, the company separated.

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EXPERIMENTS ON FULL-SIZED TIMBER TRUSSES.

By Major G. K. Scott Moncrieff, R.E.,

Late Instructor in Construction at the School of Military Engineering, Chatham.

THE ordinary timber truss used in this country for the support of roofs of moderate span—say up to 40 feet—is not, theoretically, an economical structure. If, however, requirements of practice necessitated modification of theory, there would be every reason why the present method of design should be continued. The object of the experiments here described was to ascertain whether trusses, as constructed according to the dimensions generally accepted in English practice, had any advantage, from a practical point of view, over others designed more strictly in accordance with theory, and more economical of material.

The dimensions usually accepted are those laid down by Tredgold, who wrote his great work on Carpentry in the early part of this century. In 1844 this book was officially adopted as the text-book to be used by the Engineer Department of the Army, by order of the Board of Ordnance, and it has been accepted ever since as the standard authority on the subject. The chapter on roofs in that book, after stating the objects of a roof, begins by observing "that in practice roofs are generally made too heavy, and that he will do a most acceptable service to his profession who will show how to retrench and execute the same roof with the smallest quantity of timber; he will by this take an unnecessary load off the walls, and a large and useless expense from the owner." It was to this end that the experiments were directed.

The ordinary king-post truss is dismissed by Tredgold in a very few lines. He refers to a diagram shown in fig. 1 [p. 115]. He states that in such a roof, up to a span of 30 feet, neither the purlins nor the points of support of the tiebeam come too far apart; and he then refers to tables of scantlings for the various members of the truss, at different spans, but under the same conditions of slope, roof-covering, spacing of trusses, and timber. He does not assign any reason for adopting the scantlings which he gives.

The queen-post truss is similarly briefly described.

On these brief paragraphs the whole of ordinary English practice is based.

On referring to fig. 1, it will be seen that (1) the section of the principal rafter P is of much smaller scantling than the tiebeam A; (2) that the struts, B B, are very light, and their centre lines, if prolonged, would intersect at a point considerably above the centre of the tiebeam; (3) that the purlins, C C, do not come vertically over the struts; (4) that the tiebeam and the principal are united at the heel by a strap which is fastened by a comparatively small bolt through the tiebeam.

In fig. 2, in addition to the above points, we see that (5) the straining beam, S, though somewhat thicker than the principal, is not so thick as the tiebeam.

All the above points are theoretically unsound, for the following reasons:—

(1) The actual amount of stress borne by the principal under any conditions of loading is greater than that borne by the tiebeam. This follows from consideration of the equilibrium at the junction, shown in fig. 3, which represents the triangle of forces at the joint.

(2) The struts may not always have the same amount of stress—*i.e.* if there is a greater load on one side of the roof than on the other, one of the two will have a greater stress than the other, and the effect of the arrangement of the joint will be that there will be both bending and shearing stress set up at the foot of the king-post, which it is not designed to resist. In any case the stress on the struts will be eccentric.

(3) In all cases of direct loading, eccentricity of stress tends to cause bending, and increased intensity of stress. Hence, where the purlins are not directly over the struts, not only will the latter tend to fail the sooner by lateral flexure, but there will be combined stress set up in the principals, which will also tend to fail sooner than they otherwise would.

(4) Although in this form of fastening the strap is, rightly, inclined as much as possible to the horizontal, the small size of the bolt is a serious objection, since it would have to transmit the greater part of the tensile stress of the tiebeam, and its bearing area on the timber is not sufficient to prevent the crushing of the fibres adjacent to it.

(5) The straining beam is a long column under a very considerable amount of compression. It must be designed, therefore, according to the principle of long columns of timber fixed at the ends. The dimensions given in the tables of scantlings are rarely sufficient to meet the maxima stresses. Tredgold's Tables are based upon the supposition that (1) the trusses are 10 feet apart, (2) the roof-covering is slate, (3) the pitch about 27°, (4) the timber yellow fir. He states that the scantlings are the smallest that ought to be used for good Riga or Memel timber.

It is not stated whether there is a ceiling. It may be reasonably supposed that there is—and this is an important point, because under such circumstances the provision of a deep tiebeam is desirable, so as to withstand the vertical deflection which would be caused by the weight of the ceiling. It is, however, possible to obtain stiffness without going to the expense and weight of the heavy timbers given by Tredgold in his tables.

The use of the tables being limited, in any case, to certain definite conditions of material, roof-covering, slope and spacing of trusses, it is evidently desirable that some general rules or formulæ should be prepared, whereby the scantlings of roofs under any circumstances might be arrived at. Such formulæ have been published, and have been in use for some time. They are shown in an Appendix [pp. 125–26].

Before being perfectly certain, however, that trusses based upon theoretical principles could be more economically made than those designed by Tredgold, it was necessary to subject specimen trusses of both kinds to tests. It was further necessary to have these tests carried out on full-sized trusses, as models might give unfair results.

In order to secure the best results in the theoretical truss, it was necessary so to design it that, at the various joints, the axes of the various members should intersect on the central fibres of other members, and thus insure concentric stress. To this end the design of the joints was reconsidered. Fig. 4 shows the modified form of the joint at heel of principal. In this case the stress on the strap is a minimum, owing to its horizontal position. The bolt passes through a chock of wood between the halves of the tiebeam,* and this chock is housed for a short depth in these halves at either side to prevent slipping. Fig. 5 shows the arrangement at the foot of the king-post.

The first experiments were carried out on trusses resting on two brick pillars about 2 feet square and 6 feet high. In the brickwork near the ground was built an ordinary I-rolled steel beam. On the truss, at points corresponding to the positions of the purlins, were

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* In this design a double tiebeam is substituted for the single one in Tredgold's design.

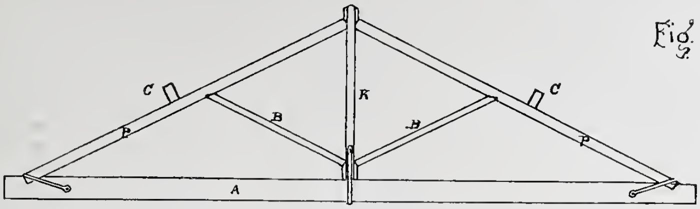


Fig. 1

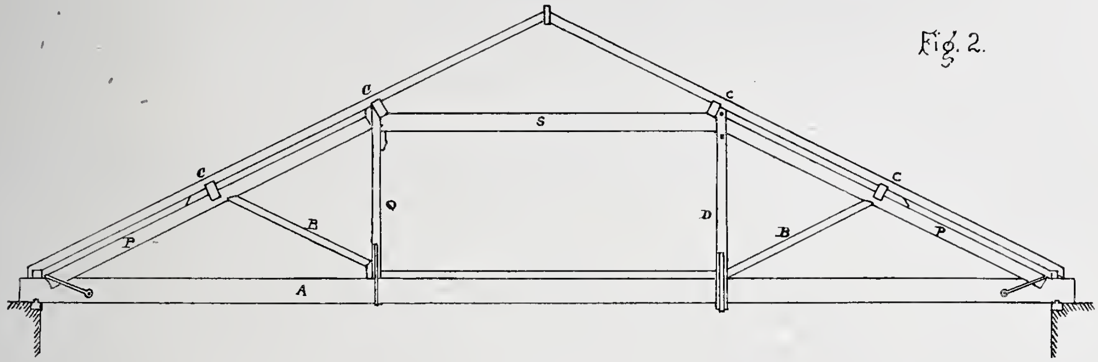


Fig. 2.

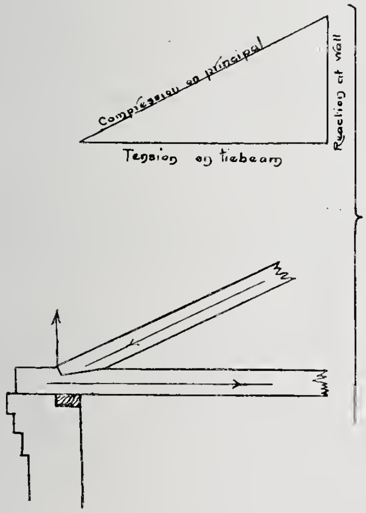


Fig. 3.

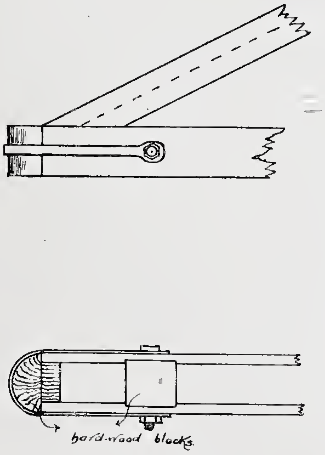


Fig. 4.

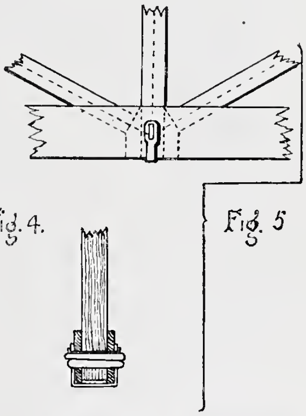


Fig. 5

(Figs. 6. & 7. on subsequent pages)

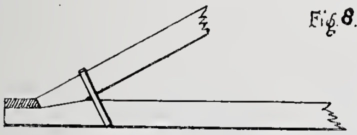


Fig. 8.

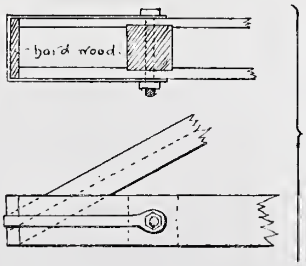


Fig. 9.

suspended Duckham's patent weighing-machines, which had a block and tackle suspended from them, with a corresponding block hooked on to a screw coupling fastened to the I-beam.

The tackle was hauled up as tight as it would go, and extra pressure was put on by screwing up the coupling.

This method was unsatisfactory, because it was found that if any load or fastening slipped, the man working the screw coupling was exposed to considerable danger, and also the Duckham weighing-machines were not very sensitive. It became necessary to devise some other plan.

A scheme was at first worked out whereby the pressure would be produced by two sets of treble blocks worked by windlasses, and the amount of the pressures registered by helical springs; but there were practical difficulties which caused this plan to be superseded by another, which, although it had disadvantages, was practicable, and gave interesting results.

By this scheme an ordinary 7-inch steam gauge was connected with a shallow cylinder in which worked a ram or piston 50 square inches in area. As the steam gauge registered the pressure per square inch, any readings indicated on the dial would be one-fiftieth of the actual pressure on the cylinder. Each of these cylinders was carefully tested by a system of levers. It was found to give very accurate results.

The actual pressure brought to bear upon the cylinders was produced by hydraulic jacks, worked by men pulling a rope attached to the handle of the jack. During the tests no workmen came near the apparatus, so that if anything gave way, nobody could be hurt. No accidents occurred.

The amount of pressure required is considerable. If we consider each truss to be spaced at 10 feet, in accordance with Tredgold's data, and the weight of the roof covering, including occasional loads, to be 40 lbs. per square foot, we have 400 lbs. per foot run of slant length, whatever the span may be. In a 28-foot span, the slant length of the common rafters is about 32 feet (the rise being 7 feet), so that the load amounts to 12,800 lbs. Of this, half, approximately, will be borne by the purlins, and half will rest on the pole plates. None will be borne vertically at the ridge, as usually constructed. Each purlin, therefore, will have to bear 3,200 lbs.; and as the roof must be designed with a reasonable margin of safety, it was clearly necessary that the testing apparatus on each purlin should be able to stand 12,000 or 13,000 lbs.

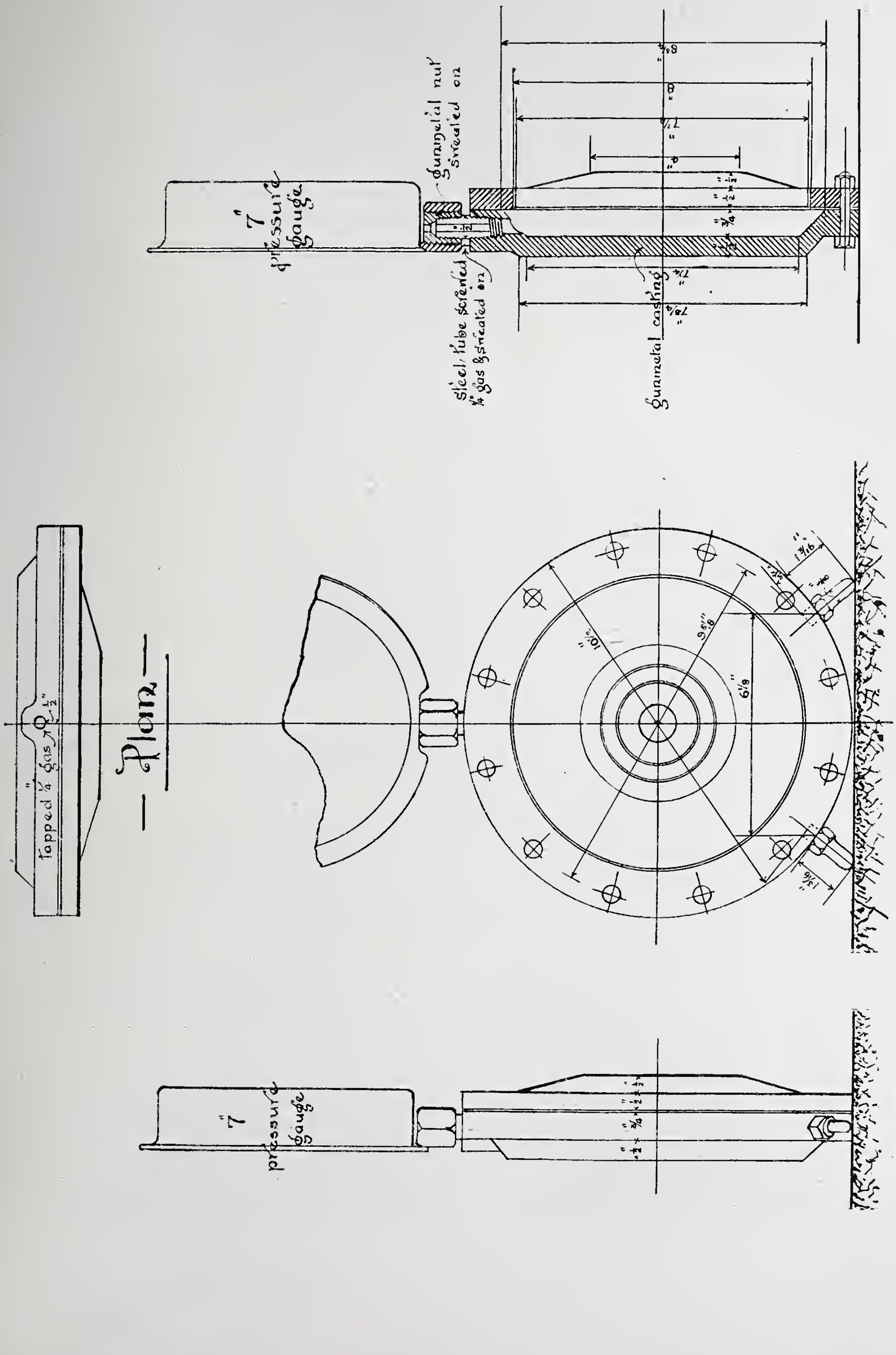
The truss, then, was laid on its side as shown in fig. 7 [p. 119]. A rolled steel beam was used for taking the pressures, and steel straps or sling bars 4 inches by $\frac{5}{8}$-inch total, or 3 inches by $\frac{5}{8}$-inch net section, connected the ends of the truss with the steel beam. The hydraulic jacks and rams were introduced at the positions of the purlins.

It will be observed that the sling bars have slots cut in them, so as to be available for different sizes of trusses. A packing piece of steel was introduced at the place where the wall plate would ordinarily come, but there was no substitute for the pole plate. This fact placed the tested truss at a slight disadvantage, in respect of rigidity, with the ordinary truss in a building, because, as tested, its rigidity was that of a *supported* beam, whereas really the effect of the pole plate and its superincumbent load is to *fix* the ends, or at all events to make them nearly fixed, and, of course, greatly to reduce the deflection.

(1) The first test on this system was carried out on a king-post truss made after the usual pattern, but with principal rafter and tiebeam of the same scantling. This truss was 29 feet span, the principals and tiebeam being both 5 inches by 4 inches, and struts 4 inches by 4 inches, the heel straps $1\frac{1}{4}$ inch by $\frac{1}{4}$ inch, with plates 3 inches by 4 inches below, and $2\frac{3}{4}$ inches by 4 inches above. These heel straps were made at right angles to the principals. The end of the tiebeam projected for about 9 inches beyond the heel of the principal.

The object of this test was to ascertain whether the tiebeam of a truss, if of the same scantling as the principal, would be likely to fail; and if so, where.

When the pressure reached 12,000 lbs. on each side, the end of the tiebeam sheared off



Section.

Front Elevation.

Side Elevation.

FIG. 6.—HYDRAULIC BALANCE. SCALE ¼ FULL SIZE.

as shown in fig. 8 [p. 115]. At the same time, on the other side, the plates both above and below crushed into the timber. There was no indication of any other failure in the truss. The pressure on the plates was very great, amounting to nearly 5,000 lbs. to the square inch ($12{,}000 \times \operatorname{cosec} 27^\circ \times \cot 27^\circ \div 2\frac{3}{4} \times 4 = 4{,}974$), which is more than the ordinary crushing resistance of fir, transversely to the grain. Apparently on one side the straps were doing all the work of resisting the thrust, and transmitting it to the tiebeam; while on the other side the strap was not so tight, and the joint in the timber had to take at least part of the stress, which amounted to about 24,000 lbs. The area to resist shearing was 4 inches by 9 inches = 36 square inches, hence the stress intensity was $24{,}000 \div 36 = 668$ lbs. The ultimate resistance of fir to shearing along the grain is 500 lbs. per square inch: so that, if the straps were at all loose (as in practice they might easily be), failure in this particular way would be almost inevitable.

The actual maximum weight which the truss would have to bear in a roof would be about 6,600 lbs. over each purlin; so it may be said to have been tested to about twice its maximum load.

All that could be said to have been proved by this test was that it showed in such a truss the scantlings of the various members were quite sufficiently proportioned, but the joint was weak. Tredgold's joint, *with a large bolt*, would have held, no doubt.

(2) The next test tried was the same truss (span 29 feet), except that, instead of the solid tiebeam, planks 5 inches by $1\frac{1}{2}$ inch were substituted, with a horizontal strap, 1-inch bolts, and end blocks. The latter were not of the semicircular shape shown in fig. 4, but of the angular shape shown in fig. 9, with wedges of hard wood tightening up the whole. This was very speedily proved to be a failure. At about 7,500 lbs. on each side the pressure bent the straps and split the wedges. This showed the necessity of some modification of the form of block, and the semicircular form then introduced has since been used with most satisfactory results.

(3) The third trial was a truss of 28·feet span, with 6-inch by $3\frac{1}{2}$-inch principals, 4-inch by $2\frac{3}{4}$-inch struts, $11\frac{1}{2}$-inch by 6-inch tiebeam, 6-inch by 4-inch king-post—in fact, exactly as given in Tredgold's tables.

This truss showed signs of weakness at 6000, lbs. on each purlin. At this pressure the struts buckled and crushed the fibres at the foot of the king-post. When the pressure reached 7,500 lbs. on each side, one of the principals, which had bent into a sinuous curve, split at a tight knot, and no further resistance was afforded.

This truss showed great stiffness as a whole, on account of the heavy tiebeam, but the fact of the failure having occurred so early in the operation prevented the observation of the deflection at the same pressure as some others which have been experimented on.

The fact of its having failed at a tight knot is worth noting, for it shows that the old idea that tight knots are not injurious is quite a fallacy. This has been confirmed by several similar observations.

This test was also important in showing that the weakness of the truss lay in the insufficient scantling of the compression members, and in their unscientific proportions—viz. 6 inches by $3\frac{1}{2}$ inches and $4\frac{1}{2}$ inches by $2\frac{3}{4}$ inches. These struts buckled in the direction of their least dimension.

(4) Truss 28 foot span. Principal rafters 5 inches by 6 inches, struts 5 inches by 4 inches, tiebeam double, each plank 8 inches by 2 inches, king-post 5 inches by 2 inches. This truss was for the same span as the former one, but the dimensions were calculated according to theoretical principles.

The strap at the foot of the principal was horizontal, 2 inches broad with 2-inch bolt. A bolt $1\frac{7}{8}$ inch was hardly strong enough.

This truss, when loaded with 9,000 lbs. on each side, showed some signs of weakness, the principal beginning to buckle, but it did not actually fail until, at pressures between 11,000 and 12,000 lbs., the hydraulic jacks began to leak so much that no further pressure could be attained. At this pressure the total deflection of the truss was considerable—viz. 1·75 inch; but it recovered its original form as soon as the loads were removed.

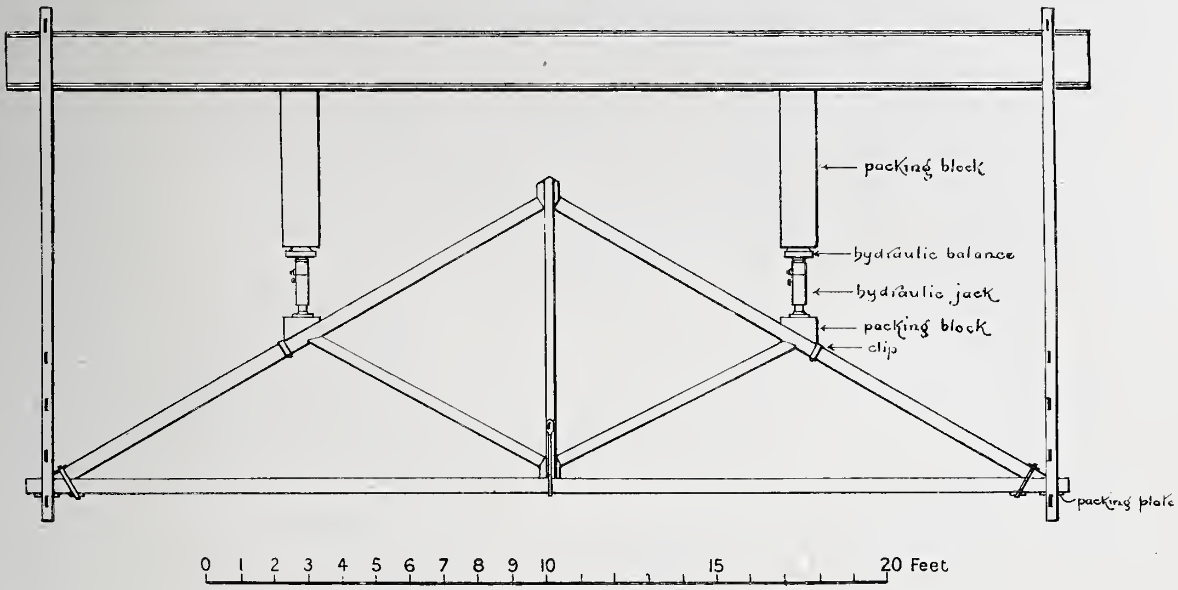


FIG. 7.—ARRANGEMENT FOR TESTING ROOF FRAMES.

Comparing this truss with the one previously tested (No. 3) we see that there was a considerable saving in cost as well as increase of strength. It would be, perhaps, unfair to base any general deduction from the comparison; but it may be said that, so far as we have gone, theory had given better results than practice. Truss No. 3 had failed under a load equivalent to 75 lbs. per square foot of roof, while truss No. 4 had borne without failure a weight corresponding to a uniform load of 137 to 140 lbs. per square foot.

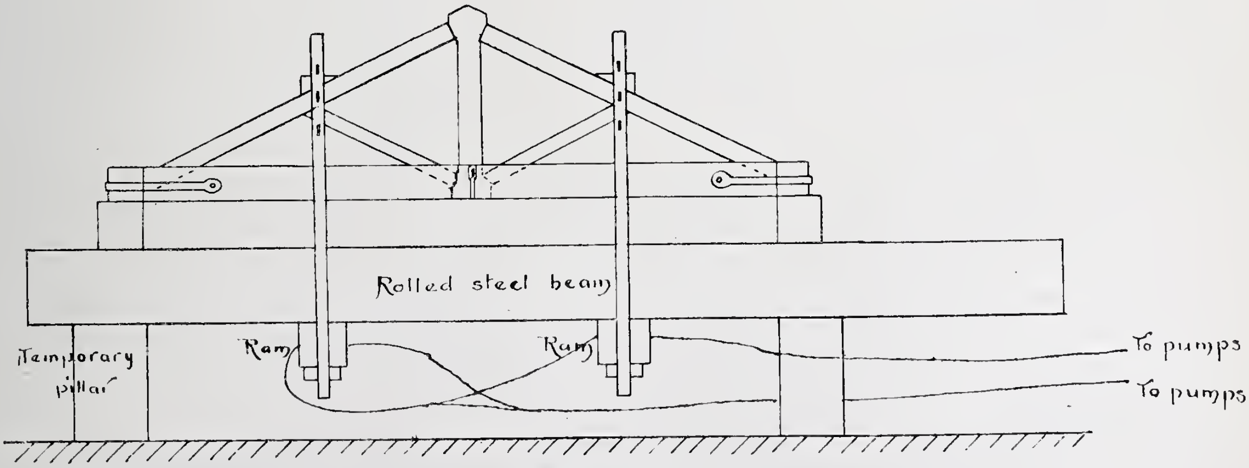


FIG. 10.

At this stage of the experiments it was thought advisable to make some alterations in the methods employed. The fact of the hydraulic jacks leaking at high pressures was very unsatisfactory, and it was considered also very disadvantageous to have the truss lying on its side, a position which might suffice for purposes of comparison, but which would not give such true results as to the actual bearing power of the truss as would be the case if the truss were in a vertical position.

Special hydraulic rams were cast, and connected by means of ordinary lead gas-piping with pumps in an adjacent building, in which were also fixed on each system of pipes the 7-inch gauges as before. It was therefore possible to work the pumps at some distance from the truss, watching the effect from a window. The trusses were placed vertical, as they would be in a building. The rolled steel beam against which the rams worked was raised on props a few feet above ground, the truss was supported on blocks which rested on the steel beam, and the steel straps, as before, passed over the truss and under the hydraulic rams. The difference between this method and the former one was that in this the steel straps pulled at the truss, whereas in the other the hydraulic jacks pushed at the truss, in both cases exercising pressure at those places where the purlins would ordinarily come.

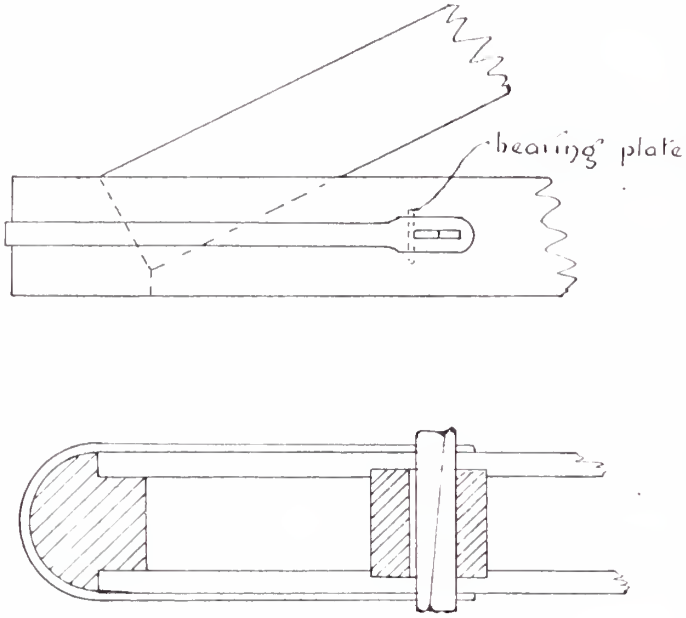


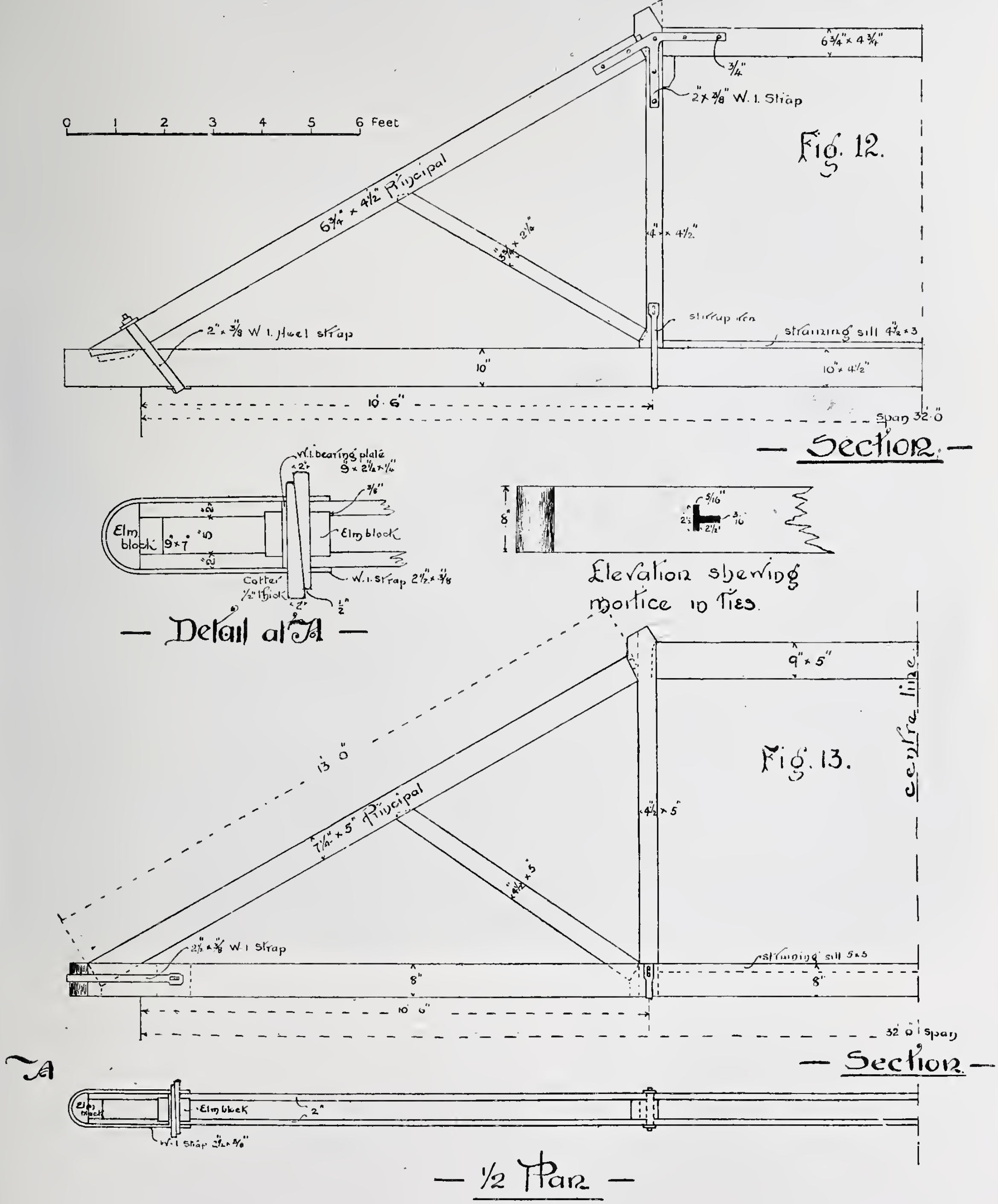
FIG. 11.

The first truss to be experimented on in this manner was the same (No. 4) as had been previously experimented on, and had then withstood any attempt to destroy it. At 10,800 lbs. the truss began perceptibly to buckle, and at 17,850 lbs. the principal on one side gave way by combined crushing and bending. The whole truss had distorted laterally to a very great extent, which would no doubt have been considerably diminished if it had been stiffened, as in the case of a roof in actual use, by lateral purlins, &c. The weight of the two hydraulic rams and sling bars was $11\frac{1}{2}$ cwt. = 1,288 lbs., so the total weight on the truss at the time of failure was 19,138 lbs., or about 9,500 on each purlin. This amounts to a direct thrust of 21,600 lbs. on each principal, or 1,080 lbs. per square inch. The truss was calculated to bear a safe load of 600 lbs. per square inch. The failure was found to have taken place at small knots. The truss had been lying about exposed to wintry weather for some months, and the timber had shrunk a little at the foot of the principals, and this had made the joint there somewhat loose.

The total weight at which this truss had failed—19,138 lbs.—was, it will be observed, considerably less than the weight it had withstood on a previous trial, when it had borne upwards of 22,000 lbs. without failure. The reason apparently was that the shrinkage of the joints had made local pressure more severely felt on some parts of the structure, with the accompanying disadvantages of eccentric loading. This pointed to the necessity of so designing the joint as to be able to tighten it up at will.

The next trusses experimented upon were 24-feet span.

One of these (No. 5) was of Tredgold's dimensions: Principals 5 inches by 4 inches, struts 4 inches by 2½ inches, king-post 5 inches by 3½ inches, tiebeam 10½ inches by 5 inches. Cost £2. 16*s*. 1*d*.



QUEEN-POST TRUSSES.

Under a total pressure of about 15,600 lbs. the principal rafter showed signs of splitting. At 20,000 lbs. the lateral deflection as a whole was about 4 inches. At 22,000 lbs. the truss absolutely failed by cracking along the principals, beginning at a knot just above the junction of the struts. The vertical deflection was $2\frac{1}{2}$ inches. Taking the ultimate strength of the truss at 22,000 lbs., the *efficiency*—*i.e.* ultimate strength divided by cost in shillings—may be taken as 393. The weight per square foot at which this truss failed was about 84.

No. 7 was also 24 feet span, but considerably lighter, the scantlings being as follows:—

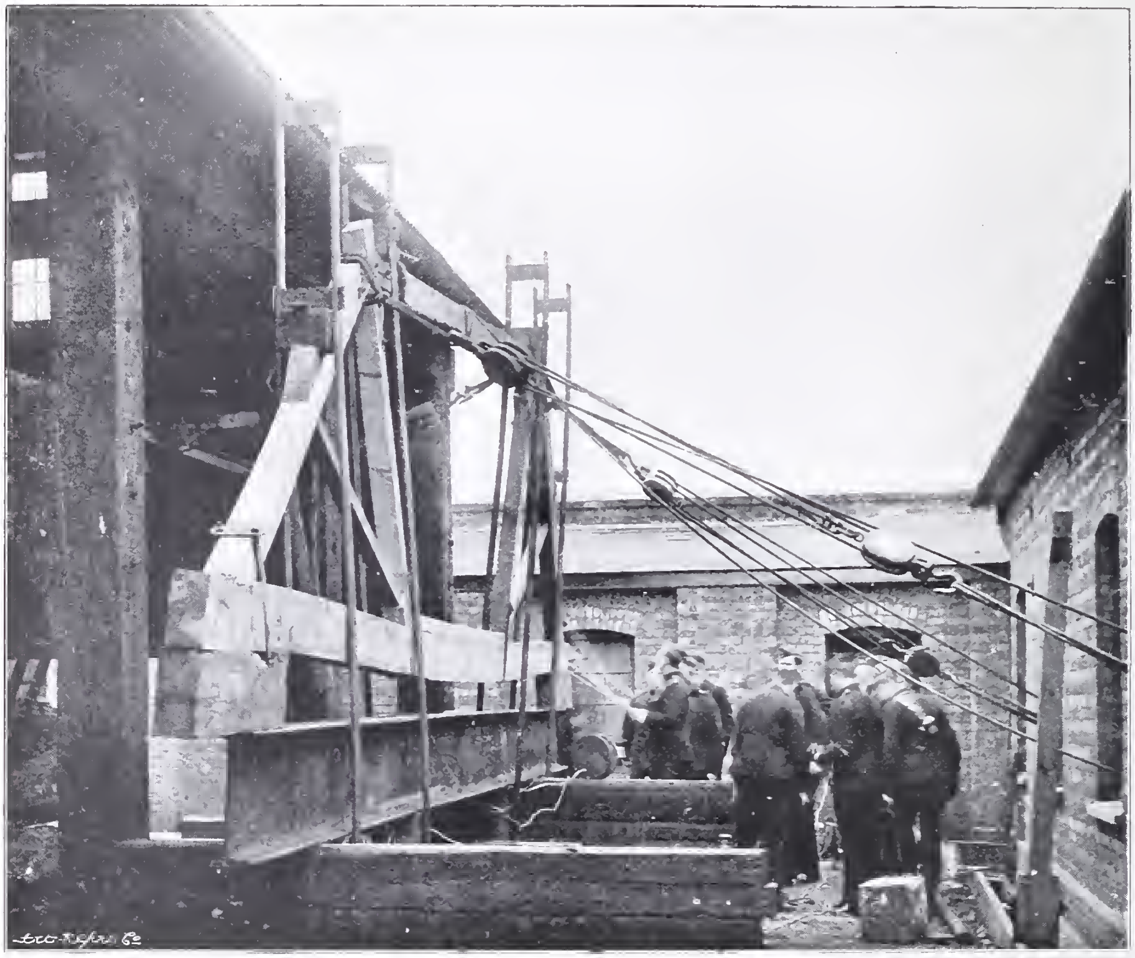


FIG. 14.—TREDGOLD'S TRUSS, 32-INCH SPAN, UNDER PRESSURE OF 31,920 LBS., SHOWING LATERAL TWISTING AND CRIPPLING OF JOINT AT HEEL OF PRINCIPAL.

Principals, 4 inches by 4 inches; struts, 4 inches by 3 inches; king-post, 4 inches by 3 inches; tiebeam double, 8 inches by $1\frac{1}{2}$ inch. Cost £2. 3*s*. 5*d*.

At 15,000 lbs. there was no sign of weakness, but at 20,000 lbs. the lower end of the principal pushed the heel strap into an inclined position. Taking this as failure, though no doubt the truss might have borne more, we see that the efficiency is 463, and the weight per square foot of roof surface which the truss could bear is 75 lbs. The resistance per square inch of the principal rafter works out to 1,403 lbs., whereas in No. 6 the same resistance is 1,240 lbs. The difference is no doubt due to the eccentricity of loading in the older pattern.

Failure in No. 7 was caused, however, by the same defect as noted previously in this pattern of truss—*i.e.* being unable to tighten up the joint at the junction of principal and tiebeam. This led to a modified design of this joint, shown in fig. 13, where a gib and cotter joint is given horizontally, bearing against a vertical plate which supplies the necessary bearing area to resist the pull.

(8) This was a queen-post truss 32 feet span, of the type proposed by Tredgold, with scantlings as follows:—Principals, $6\frac{3}{4}$ inches by $4\frac{1}{4}$ inches; struts, $3\frac{3}{4}$ inches by $2\frac{1}{4}$ inches; tiebeam 10 inches by $4\frac{1}{2}$ inches; queen-posts, 4 inches by $4\frac{1}{2}$ inches; straining beam, $6\frac{3}{4}$ inches by $4\frac{3}{4}$ inches; straining sill, $4\frac{1}{2}$ inches by 3 inches. See fig. 12.

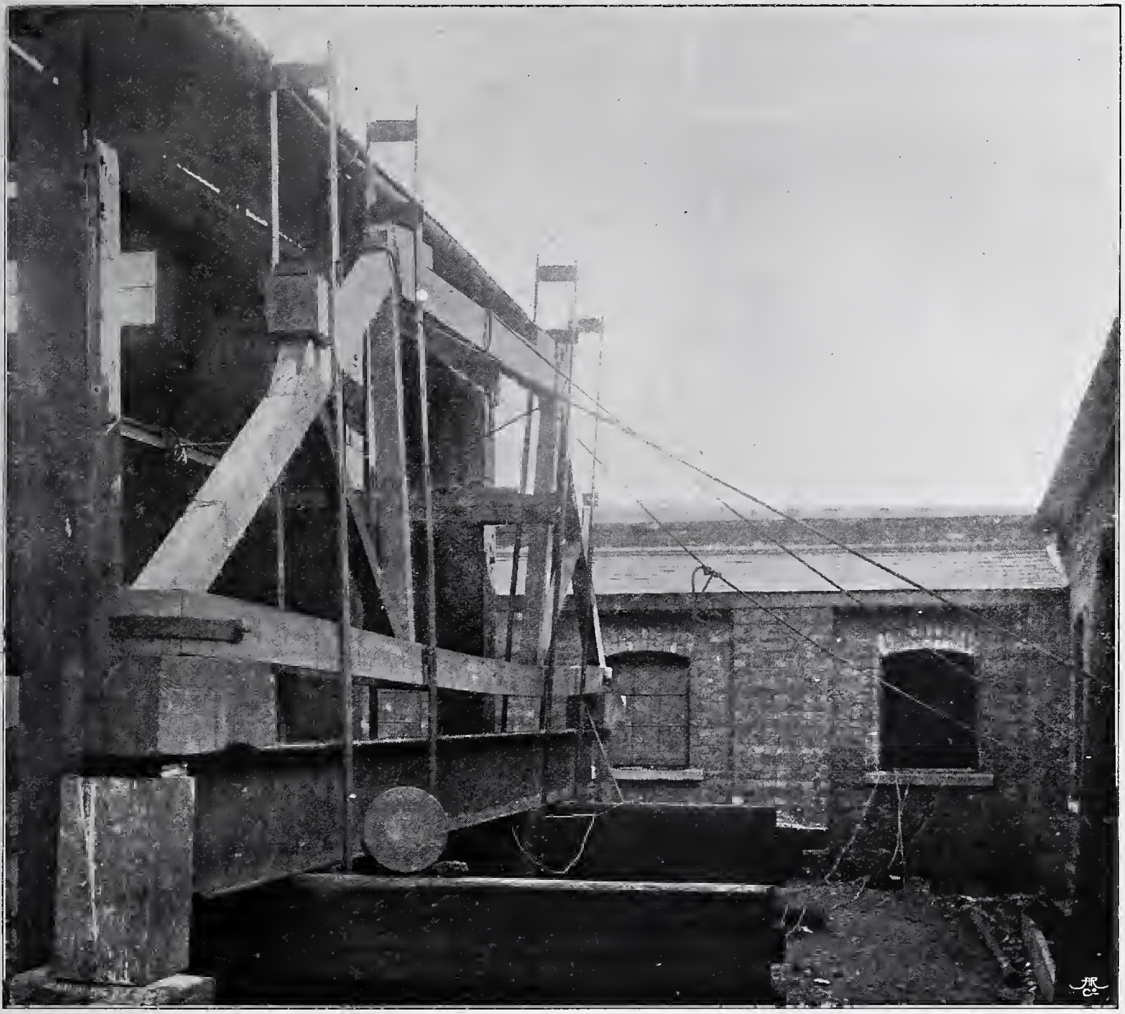


FIG. 15.—SPECIAL TRUSS, 32-INCH SPAN, UNDER PRESSURE OF ABOUT 24,000 LBS.

The great difficulty in this test, and in that of a truss of similar span designed with a double tiebeam, was to prevent lateral deflection, or buckling of the truss as a whole. Endeavour was made to keep the structure as stiff as possible by means of stays formed of blocks and tackle, on both sides; but even this was not thoroughly efficacious, and the trusses were not, in either case, tested to actual destruction, although they were both crippled. The cost of this truss was £4. 10*s*. 3*d*.

At a pressure on the whole truss of 24,780 lbs. the fibres at the ends of the struts began to be crushed, and the queen-posts showed signs of shearing along the grain at the places where the struts were tenoned into them.

At 31,920 lbs. the joint at the foot of the principal was crippled, the fibres of the timber being crushed, and the strap strained and bent.

The truss as a whole was now so distorted that it was hardly feasible to continue any further test. The truss was taken down and a new strap put in at the heel of the principal, inclined as much as possible to the horizontal. It was again tested, but the strain it had already been subjected to had evidently had an injurious effect on its elasticity, for after the pressure had reached 37,680 lbs. it buckled laterally to such an extent that it slipped off its bearings, without, however, any actual fracture.

(9) This truss, shown in fig. 13, was for the same span as No. 8, but it had a double tie-beam, stouter principals and other compression members, and less ironwork.

This truss was tested twice, and exhibited even more than the former one the tendency to twist laterally, owing doubtless to the absence of iron at the joints. There was no failure of any of the joints or of any of the members, and it is probable that if it could have been kept true in a lateral direction, it would have exhibited very great strength.

At about 30,000 lbs., however, the lateral twisting caused the temporary props on which the whole was resting to be overturned, and in the fall the truss was so damaged that it was not considered worth while to test it again. As compared with the former truss the cost was considerably less, being £3. 14*s*. 8*d*.

The accompanying photographs [figs. 14, 15] show the apparatus.

The experiments are by no means conclusive, but I think that they show, so far as they have gone, that it is possible to introduce considerable economy into the design of trusses made of timber, and that the subject of the best design has not yet been fully exhausted in trade practice.

The method of applying the test was suggested to me by Captain Gaynor, R.E., who took the greatest interest in the experiments, and whose assistance, as well as that of Captain Joly de Lotbinière, R.E., I take this opportunity of gratefully acknowledging. The method of testing is of course capable of application to any beam, girder, or truss under transverse strain.

APPENDIX.

FORMULÆ FOR CALCULATING SCANTLINGS IN ROOFS OF TIMBER

King-post and queen-post trusses.

Here W=weight of roof covering+snow
,, ,, common rafters
,, ,, purlins
,, ,, principal
,, ,, ironwork (see below)
,, ,, wind pressure or other occasional load.
} Borne vertically by one principal rafter

w_c=weight of tiebeam+ceiling+king-post+two struts, or ditto ditto+two queen-posts+straining beam+straining sill+struts.

θ=inclination of the roof to the horizon.

For a king-post truss :—

Thrust on heel of principal $=(\frac{13}{16}\mathrm{W}+\frac{5}{16}w_c)$ cosec θ
Tension in tiebeam . $=(\frac{13}{16}\mathrm{W}+\frac{5}{16}w_c)$ cot θ
Thrust on strut . . $=\frac{5}{16}\mathrm{W}$ cosec θ
Tension in king-post . $=\frac{5}{8}(\mathrm{W}+w_c)$

For a queen-post :—

Thrust on heel of principal $=(\frac{13}{15}\mathrm{W}+\frac{11}{30}w_c)$ cosec θ
Tension in tiebeam . $=(\frac{13}{15}\mathrm{W}+\frac{11}{30}w_c)$ cot θ
Thrust on strut . . $=\dfrac{\mathrm{W}}{6}$ cosec θ
Thrust on queen-post . $=\dfrac{\mathrm{W}}{6}+\frac{11}{30}w_c$
Thrust on straining beam $(\frac{11}{20}\mathrm{W}+\frac{11}{30})$ cot θ
Thrust on straining sill $=\dfrac{\mathrm{W}}{6}$ cot θ

Ironwork in trusses 20 lbs. per principal rafter

Strap and plate at foot of rafter in a timber truss, when the strap is at right angles to the principal.

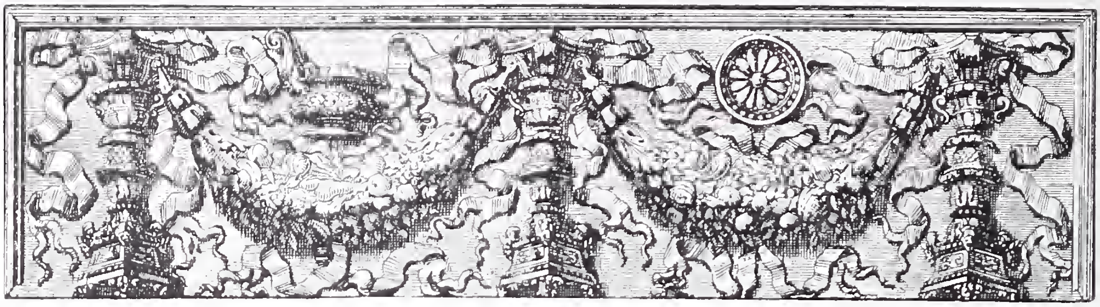
If P=thrust on principal, A=sectional area of each limb of the strap, $r_t=7$ tons per square inch =safe stress in this case.

$$\mathrm{A}=\frac{\mathrm{P}\cot\theta}{2\times r_t} \qquad (20)$$

As regards bearing plates on tiebeam and principal, b being the breadth of those beams, =length of plate, $r_c=1{,}200$ lbs. per square inch for fir.

$$l=\frac{\mathrm{P}\cot\theta}{b\times r_c}$$

N.B.—If the strap is inclined to the principal at a less angle than 90°, find the value of the tension by triangle of forces, the hypotenuse of the triangle representing the tension on the strap found in (20).



THE LATE THOMAS HAYTER LEWIS, F.S.A.,

Emeritus Professor of Architecture.

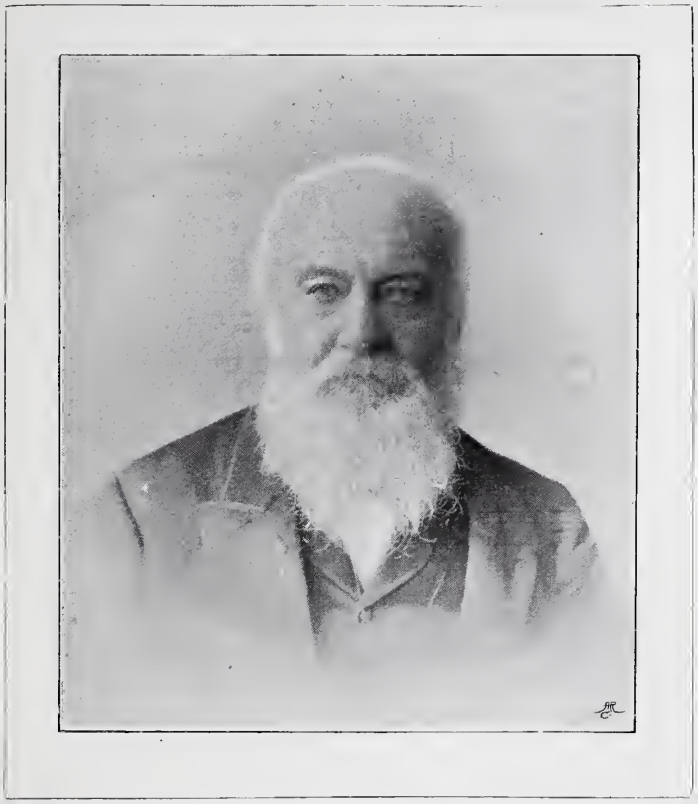
THE late Thomas Hayter Lewis began his professional career as a pupil in the office of Joseph Parkinson, of 41 Sackville Street, and he afterwards entered that of Sir William Tite, with whose nephew, Arthur Green, he was engaged on the working drawings of the Royal Exchange, which was then being erected. About, or during, this period he competed successfully for the Silver Medal of the Royal Academy, gaining it for a measured drawing of the façade of the Oxford and Cambridge Club, Pall Mall. He entered into partnership with Thomas Finden, the brother of the engraver, in 1849, and he was engaged in the active practice of his profession for the following twenty years, ten only of which were in partnership.

Although the Professor attained to a great age, the period during which he practised was comparatively short; he devoted much of his time to travel and literary work, and after the death of Mrs. Lewis in 1869 he gradually gave up all the more active duties of his profession. He nevertheless carried out many works of interest and importance, although comparatively little of ecclesiastical work; but among his church restorations may be mentioned Staplehurst, Horley, Willen, Dunkirk, and S. Martin's-in-the-Fields, London. But the work with which he most identified himself, and the initiation of which was largely due to his exertions, was that of the restoration of S. Bartholomew the Great in the City. His report on this church, published in 1863, and the pamphlet by James Henry Parker, for which he prepared the illustrations, formed the starting point of the work, and the fund then in consequence raised enabled him to complete the Norman arcade of the apse and to save the north aisle, then in imminent danger of falling, without reconstruction. But these works, together with those required for lowering the level of the accumulated earth in and around the church, and others equally necessary, exhausted the fund, and it is but recently that other hands have been enabled to resume the work he so ably began.

He erected several large country houses in the neighbourhood of London, such as The Hall, Warninglid, Sussex; Staplehurst Place, Kent; Stone Lodge, Horsham: The Knowle, Brenchley; Denham Lodge, Uxbridge; and one at Geelong, Australia, much of the prepared material for which was sent out from England. He was architect for the cross in front of Netley Hospital, erected as a memorial to the medical officers of the Army who fell in the Crimea, the foundation-stone of which was laid by H.R.H. the Prince of Wales. He added the large chapel and a music-room, with a remarkable open timber roof, to Gilbert Scott's Infant Orphan Asylum, Wanstead, as well as a chaplain's house and lodges. At Chesham he erected the village hospital, and at Staplehurst the Board Schools—among the first in

England—of rag and terra-cotta. Several large wharves and warehouses, demanding very considerable knowledge of construction, were carried out by him in London, such as Hedge's Wharves at Wapping, Reed's Upper and Lower Wharves, Bermondsey, and Zetterquist's Factories, Blackfriars; he to a great extent rebuilt Messrs. Hoare & Co.'s Red Lion Brewery and Messrs. Boord's distilleries in S. Bartholomew Close, and he was the architect of the Union Assurance Society's Offices, Cornhill.

His connection with University College, London, as Professor is referred to below. But it is necessary here to describe the part he played in dealing with the difficult problem of the completion of the building, particularly the South Wing, in providing the accommodation the authorities required and yet preserving intact the design of Professor Wilkins as a whole. This difficulty was greatly enhanced by the number of drawings and engravings extant, showing many divergencies, some, perhaps, without Wilkins's authority; and he devoted much time and research to discover what mode of treatment would most accord with Wilkins's discoverable ideas.* These designs differed considerably in the arrangement of the internal angle of the wings and main building, the central feature of the façade of the wings, and in several minor details, and there seems but little doubt that the arrangement he eventually carried out was the best that could be adopted, and in no way disturbed the unity of the original



From a Photo. by Mr. Barraud.

THE LATE PROFESSOR HAYTER LEWIS.

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* Report on North Wing, University College (p. 15). Privately printed.

conception. He also prepared the designs for the North Wing, containing the Slade and Physiological Schools, with the chemical laboratories in the rear; but although the foundation-stone was laid by Earl Granville, before his retirement, it was only after his retirement that the work was carried out.

Of his great work, the Panopticon, it is not necessary to speak in much detail; the building itself has been destroyed by fire, but full information as to its peculiarities will be found in the Paper he himself contributed to the Institute. Its later years of use, or degradation to the purposes of a music-hall, before its destruction, might make many forget that it was erected at first purely as a technical school for chemistry, electricity, &c., the admission of the public to the lectures being distinctly subservient to the main object. The names of the original promoters, such as Samuel Gurney, F. Marrable, and E. M. Clarke (father of Mr. C. Purdon Clarke, C.I.E.), are sufficient warranty for this; but the scheme eventuated in failure, and the architect received little, if any, compensation for all his skill and labour. The principal thing to remark about the building, apart from its perfect construction, was the novel style in which it was designed—Egyptian Saracenic—and the profusion of decoration employed throughout. Marbles, mosaic and painted tiles, all in an unfamiliar style, had to be drawn full size by the designer, who had as well, to a great extent, to instruct the workmen. Although at the time of the erection of this building he was in partnership, the character of the work precluded him from receiving any assistance, and the whole credit for the inception, designing, and completion of the building are due to him personally.

Many years after this work was done he received a commission from the Khedive to make designs for a hall on similar lines to be erected in Cairo, and he prepared and sent out to Egypt complete working and decorative drawings; but whether or not the building was erected is uncertain. He also prepared, on the instructions of the Crystal Palace Company, a design in colour for the case of a huge organ to be erected in the main transept the full height of the building, but the organ was never built. He was not favourable to the system of open competitions, but he sent in a design, on invitation, for the Natural History Museum, and also one for the Cambridge Town Hall under similar circumstances. He had an extensive practice as a consulting architect and arbitrator, and he held the position of architect and surveyor to several Companies in the City, as well as to the Metropolitan Fire Brigade, until it was absorbed by the Board of Works.

He was elected in 1864, in succession to the late Professor Donaldson, Professor of Architecture at University College, London, and delivered his inaugural address the next year; and in 1871 became the Dean of the Faculty of Arts. His lectures, which were most carefully prepared, were very detailed, and were illustrated by diagrams taken in a large part from his own studies, and these lectures were much appreciated by a long succession of students. He resigned the position through ill-health in 1881, when he was elected Emeritus Professor.

His travels were frequent and extended, and it is difficult to put them in proper order or to describe them. He went on his first great tour through France, Italy, Sicily, and Greece in 1841–42 with Arthur J. Green (nephew to Sir W. Tite) and Horace Jones, and they were subsequently met or joined by John Whichcord and Ewan Christian. Whether during this tour he visited Cairo appears uncertain, but is probable, as it seems unlikely that he would have erected the Panopticon in the style he did—Egyptian Saracenic as distinguished from Alhambresque—without a previous study of the buildings in Cairo; and, besides, the years following 1842 must have been too much occupied in establishing himself in practice to allow of an extended tour in the East. In 1850 he was in North Germany, where he was deputed to make a survey of the City of Hamburg with a view to reporting on its condition as modified by the partial rebuilding after the great fire. During the years from 1859 to 1869 he made several visits to the south of France, extended to Algeria, and after that period he resumed his visits to Egypt, Palestine, and Greece, as well as, for the purpose of his *Holy Places*, Constantinople, Spalato, and Rome. His last visit to Greece seems to have been in 1884, when he was accompanied by his only son, the Rev. Edward Lewis, who predeceased him by only a few months.

Of his connection with the Institute, and of the position he held in it, it is not necessary to speak at length, for his history runs through the record of our TRANSACTIONS and JOURNALS for over fifty years. He became an Associate in 1845, and a Fellow in 1852. In 1859 he was appointed Honorary Secretary in conjunction with C. C. Nelson. He at once set to work to attempt, so far as possible, to heal the feud which then ran high between the Classic and Gothic men, and a meeting was held at his chambers, which was attended by W. Tite, G. G. Scott, and other principals on either side, with the happy result that in 1859 and 1860 several of the leaders of the Gothic party joined the Institute, and were followed by many of the juniors. He did not hold the office for long, as the Honorary Secretary of those days had practically the whole of the correspondence and TRANSACTIONS to attend to, as well as to supervise in part the Library duties, which were very onerous. He was twice a Vice-President, and it was only failing health which compelled him to refuse to allow himself to be nominated for the Presidentship in succession to Mr. G. E. Street. In his letter to the Institute, dated 27th February 1882,* he says, in reference to his proposed nomination:—"When I declined the office last year I thought it very possible that travel and rest might enable me to perform my duties as Vice-President, and that when Mr. Street's term of office expired I might perhaps find myself strong enough to be his successor. . . . But the rest I thought I should have as his Vice-President was cancelled by his lamented death. . . . I feel, therefore, compelled in justice to my colleagues and the members . . again to decline the honour of being nominated as President." To him was to a great extent due the inauguration of the Voluntary Examinations; and it was during the period of his Hon. Secretaryship that the scheme was formulated and the details worked out in conjunction with the late A. A. Ashpitel, John Papworth, Professor Roger Smith, and others.

He was always a careful and observant sketcher, and disliked the use of the straight-edge, the camera-lucida, and other mechanical contrivances; he considered that they induced carelessness, and by saving either labour or time made the study of the building, to which the sketching was a means rather than an end, superficial. Some of his early pencil sketches of Italian interiors are models of accurate perspective. A large number of his drawings have been published in the Architectural Publication Society's *Dictionary*, to which he was a large contributor, but being executed in chalk lithography the reproductions do not do justice to the originals. Some of his sketches are to be found in the *Architectural Association Sketch Book* and the TRANSACTIONS of the Institute.

The following list of papers read by him to the various Societies with which he was connected, although doubtless incomplete, shows the wide range of his studies and his intimate knowledge of every branch of our profession, from Construction to Archæology. Before the Institute he read papers on the "Panopticon" (1853), "Remarks on Domes" (1857), "Experiments on Concrete" (1857), "Construction of Domes" (1859)—this being one of the last papers read in the old Grosvenor Street rooms of the Institute—"Researches on Colour and Coloured Decoration" (1862), "Fireproof Materials and Construction" (1865), "Notes on Celtic, Roman, Moorish and other Remains in Algeria" (1868), "Architectural Education" and "On Fireproof Floors"—within two days of each other—(1871), "On Ancient and Modern Egypt" (1875), "Persian Architecture and Construction"—in conjunction with Mr. C. Purdon Clarke—(1881), and "Notes made during Two Tours in Greece" (1887). Before the Architectural Exhibition he read Papers on "Saracenic Architecture" (1859) and on "The South of France" (1863); to the Architectural Photographic Society a Paper on Cairo (1859), and to the Architectural Association on Architecture in France (1864). An inaugural address on "The Fine Arts, and their Connection with Education" was delivered by him at University College, London, and afterwards printed in pamphlet form.

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* *Proceedings R.I.B.A.* 1881–82, p. 152.

His published works are not numerous, but show the same broad scope of his attainments and observations. In conjunction with Mr. G. E. Street he re-edited and practically re-wrote the article on Architecture for the ninth edition of the *Encyclopædia Britannica*, Mr. Street confining himself to the Gothic portion of the article; and it is worthy of note that the Professor, in the main, corrected the proof-sheets when travelling in Africa. His principal work, *The Holy Places of Jerusalem*, illustrated from photographs taken by Lord Kitchener of Khartoum (then Lieutenant Kitchener), is a most exhaustive study of the subject, dealing with the theories of Fergusson and others; and with his practical and archæological experience, the result of his testing them on the spot, with the actual sites and buildings, was unfavourable to many previously accepted theories. For this task he was peculiarly fitted by his intimate knowledge of Saracenic Art and his researches in the literature of the subject. He was for long an active supporter of the Palestine Exploration Fund, and, with Sir C. W. Wilson, he annotated Procopius's account of the buildings of Justinian, and published the results. Among other pamphlets may be mentioned the "Boorg ez Ziffer, Cairo," the "Employment of Artistic Materials in the Architecture of Houses and Hospitals," the "Castles of Sandown and Sandgate," "Notes on Masons' Marks," &c.

In the Societies associated with the Institute, such as the Royal Architectural Museum and the Architects' Benevolent Fund, he took an active personal interest, as well as subscribing largely to them according to their requirements; and by many other institutions or charities not directly connected with our profession he will be greatly missed.

Although most of his professional associates and friends have predeceased him, there are still many members left who, from personal knowledge of him, will always respect his name and revere his memory; whilst the record of his life's work which he has left behind him in the annals of the Institute will enable others, who did not know him so intimately, to appreciate the loss his profession has sustained by the passing of Thomas Hayter Lewis.

J. Tavenor Perry.

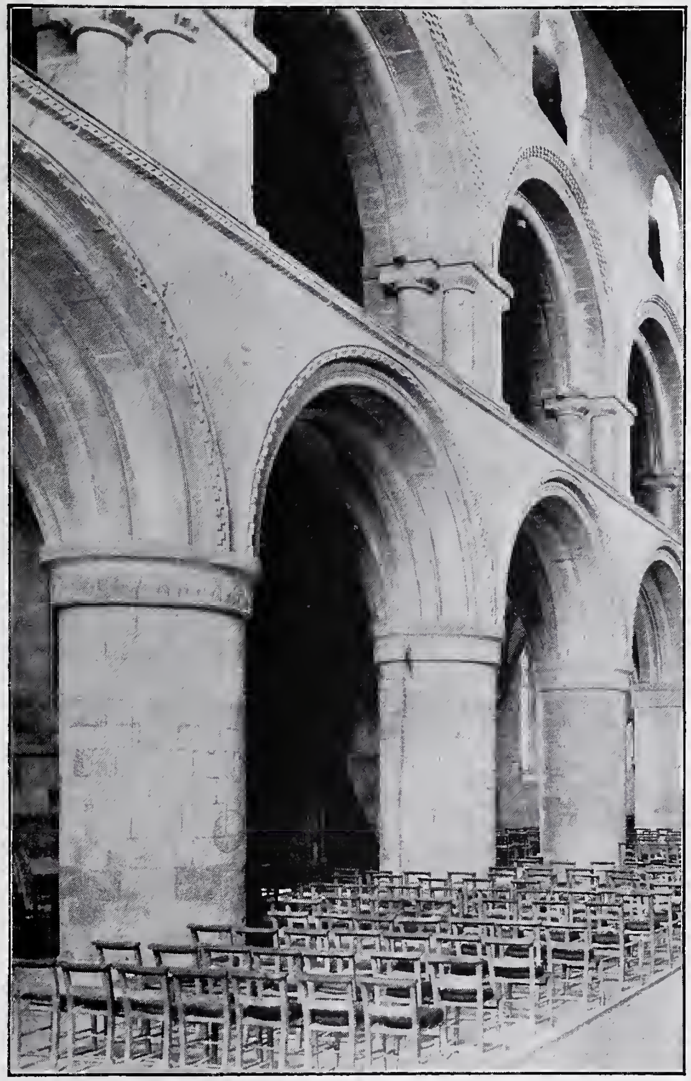
⁂ Mr. Henry Lovegrove [*A.*] writes that it may interest members to know that Professor Hayter Lewis was sometime Master of the learned Freemasonic Lodge, Quatuor Coronati, with which many members of the Institute are associated.

REVIEWS.

SOUTHWELL MINSTER.

The Cathedral Church of Southwell: a description of its fabric, and a brief history of the Episcopal See. By the Rev. Arthur Dimock, M.A. 8o. Lond. 1896. *Price* 1*s*. 6*d*. [*Messrs. George Bell & Sons, York Street, Covent Garden, W.C.*]

Mr. Dimock has written a well-arranged handbook, in which he gives, first a history of the building, then a description of the exterior and interior in chronological order, and concludes with an account of the adjacent palace and of the dissolution of the old Chapter. The illustrations are well chosen and good.



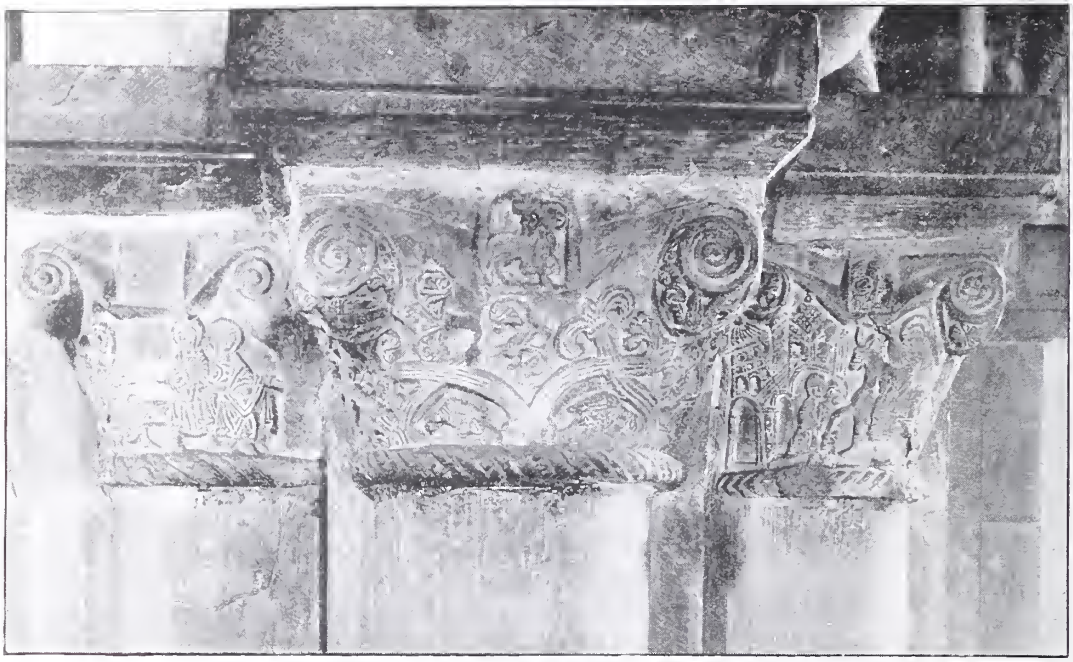
S. B. Bolas & Co., photo.

NAVE, NORTH SIDE OF ARCADE, SHOWING PART OF TRIFORIUM.

Those who are not acquainted with Southwell may begin by taking note of its long association with York, an association which only ended in 1841, when the minster was transferred to the diocese of Lincoln. Southwell grew up in Saxon times round several wells, which can still be traced, and was chosen by the Archbishops of York as their southern headquarters. It is suggested that Southwell was preferred to the neighbouring borough of Nottingham because Nottingham, as one of "the five burghs," was too turbulent for the calm course of ecclesiastical life. Soon after 1000 "that rude Anglo-Saxon church was built which supplanted some other of which we have no information" (p. 6). About a hundred years later the minster was rebuilt; the magnificent Norman nave and towers date from this period. Archbishop Walter de Gray built the choir about 1240. The Chapter-house was built some fifty years later, and the rood screen was carved in the first half of the fourteenth century.

The perusal of Mr. Dimock's handbook makes clear once more the obvious fact that many ancient buildings exercise one kind of attraction upon the mind which modern architects cannot hope to rival. The assemblage on one site of structures erected at different dates appeals to the historical imagination, and not immediately to that æsthetic perception of which the architect, so far as he is an artist, is the minister. The designer who should succeed even for the moment in producing such an effect would have to employ scenic artifices, and these can pass muster only for a time. When, for example, the details of different styles are assembled together without being brought into harmony under the influence of a dominating conception, the result is like that which arises when the English of to-day is interlarded with phrases, now antiquated, taken from Elizabethan writers or from the Authorised Version. So, with building, in seeking an unnatural emphasis, nine men out of ten fall into the bizarre and incongruous. I should be sorry if, in their turn, the beauties of Southwell were worked up as purple patches into fustian.

And yet there is one part of Southwell Cathedral which seems, in an especial manner, to contain the germ of future developments, and I venture to commend it to those who are attracted by such possibilities. The arcades of the Norman nave—an illustration is given herewith—stand halfway between the classic manner out of which they arose and the pointed Gothic into which they passed. Is there any reason why the round arch and the broad treatment of details employed by the Normans should not furnish a background for that scientific treatment of the figure which is usually confined to classical design? I cannot but think that a serious mistake in Fergusson's *History of Architecture* has been the unacknowledged source of some of the hesitancy with which architects have approached this matter. May I make a short historical digression?



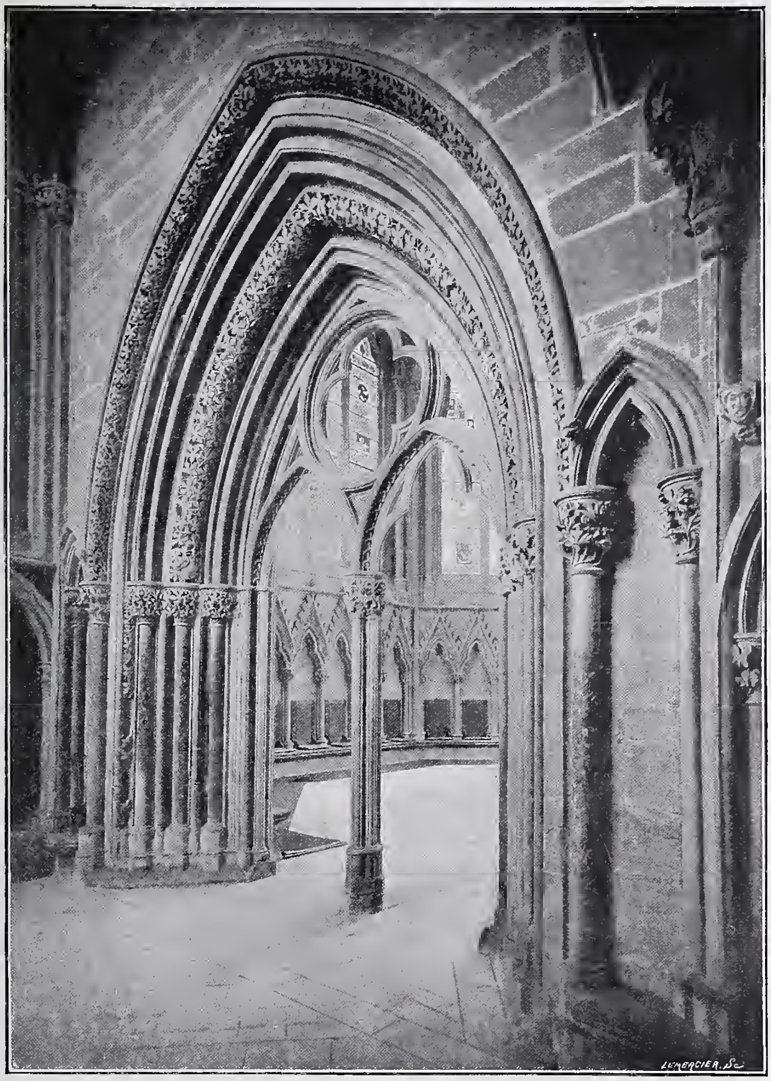
Loughton, Southwell, photo.

CAPITALS OF NORMAN PILLARS TO EASTERN ARCH OF TOWER.

Fergusson separates Byzantine from Romanesque and Norman architecture. I imagine, on the contrary, that the architects of the new capital of Constantine set the melody of which the Romanesque and Norman styles are variations. By Romanesque here I mean the buildings in the Roman style outside Rome. The buildings of Rome scarcely ever shook off the classical tradition. Outside Rome, however, whether at Ravenna or in Sicily (*cf.* Fergusson, p. 809), much work was done also by Greeks who followed the Byzantine methods; and by Byzantine I understand classical at second-hand. The sculpture of capitals and the use of mosaic as they are found in Santa Sophia are repeated in Norman and Romanesque buildings in such a way as to suggest that the same artistic tradition was at work over a wider area than is usually thought. The capitals of the Norman pillars to the eastern arch of the tower at Southwell illustrate this connection. And here, in passing, I should like to draw the attention of architects to the Norman font of the Lenton Priory Church, now preserved in the Lenton Parish Church. It is very much in the same style as the capitals illustrated, and is perhaps by the same hand. The font, I may say, is a very fine example of Christian symbolism. We are only concerned now, however, with one fact; in one of the panels there is represented a building in the Byzantine style—and this is interpreted as the Church of the Holy Sepulchre at Jerusalem. It seems probable that the mason who carved the font had either been there himself or had been supplied with drawings of the building. At any rate, this is a somewhat striking coincidence.

But why should we try to construct in imagination a new style in which mediæval methods should be adapted to a more scientific treatment of the figure in sculpture and mosaics? We have already seen its arrival. The Imperial Institute and the Birmingham Assize Courts have been two of its heralds in secular architecture. At Paris, St. Eustache and St. Etienne du Mont have been interesting essays of the same kind in the field of church building. But the new Roman Catholic Cathedral of Westminster promises to be the most brilliant example of what may fairly be called the style of the twentieth century. I hope that these reflections may not be altogether irrelevant to our neighbouring minster of Southwell, of which, after all, the Norman nave is not the least satisfactory feature.

Nottingham. FRANK GRANGER.



A. J. Loughton, photo.

DOORWAY TO CHAPTER-HOUSE, SOUTHWELL CATHEDRAL.

INCORP. 1837 1887

9, Conduit Street, London, W., 14*th January* 1899.

CHRONICLE.

Fellows elected under the Proviso to By-law 9.

At a Council Meeting of the 9th inst. the following gentlemen, unanimously recommended for Fellowship by the Council of the York Architectural Society, and found to be duly qualified according to the Charter and By-laws, were, under the proviso to By-law 9, elected Fellows of the Royal Institute, viz.:—

Charles Henry Channon, Old Maltongate House, Malton, Yorks.

William Hepper, St. Michael's Chambers, Spurriergate, York.

The Forum at Rome.

Mr. John Hebb [*F.*] writes:—

Explorations on a small scale are being carried on in the Forum at Rome by the Italian Government, who have appointed a Commission to consider and report upon the question of the rearrangement of the entire area. The Commission consists of Prof. Barnabei, General Director of Antiquities; Professor Gatti, the celebrated Latin epigraphist; the Commendatore Lanciani, Professor of Roman Topography [*Hon. Corr. M.*]; Professor Hülsen, Secretary of the German Archæological Institute; Count Giuseppe Sacconi, Member of the Superior Council of Fine Arts, Rome [*Hon. Corr. M.*]; Cav. Boni, Inspector to the Department of Antiquities and Fine Arts, Rome, and Director of Works [*Hon. Corr. M.*].

An important discovery has been made in the hemicycle in front of the temple of Cæsar of the base of an altar, or perhaps of the column dedicated *parenti patriæ*, where Cæsar's body was burned and perhaps buried. Suetonius and Cicero use the expression *bustum*, and Festus explains this word as used for the place where *mortuus est combustus et sepultus.* Five large pieces have been discovered of the frieze and cornice of the Basilica Emilia, a building which was studied by Fra Giocondo, Baldassare Peruzzi, San Gallo, and others, of which all traces had disappeared. A chamber has also been discovered in the core of the podium of the temple of Vesta. It is quadrangular, without any opening in the walls, which are of brick, probably of the time of Hadrian. It is not known whether the chamber was for the ashes of the sacred fire, or served some other purpose. Furthermore, several pieces of the Arch of Fabius and of the Arch of Tiberius have been found and placed together. A piece of a window of the upper story of the Basilica Julia has come to light, and the work is at present centred about the Via Sacra and the Rostra Vetera, of which many bits have been discovered.

The *Echo* of 30th December last states that Signor Baccelli, the Italian Minister of Public Instruction, has directed that the ornamental remains now lying in a confused mass about the Forum in Rome should be separated, classified, systematised, and replaced in their original position with all possible precision. Cav. Boni has been entrusted with the execution of this difficult work, and he has already shown his skill in reconstructing the elegant shrine standing near the temple of Vesta.

Professor Baldwin Brown's review of Dr. Ussing's Treatise on Vitruvius [p. 103] is held over for the next issue.

NOTES, QUERIES, AND REPLIES.

The Acoustic Properties of Buildings.

The Rev. Felix Shadwell, of Finningham, Stowmarket, Suffolk, contributes the following notes on the Acoustic Properties of Buildings from a speaker's point of view:—

It is well known that many churches are easier to speak in when full than when empty. The reason of this is that the congregation absorbs the sound—and often nothing more than the sound—of the preacher's voice, and checks the vibration of the main structure. Conversely, in buildings which are easy to fill with sound when empty, more effort is required when the seats are occupied—in a physical as well as in a moral sense. The resistance of the congregation has then to be overcome—and often more difficulty is encountered in making them responsive than the walls.

In a large building the resonance can be effectively lessened by the introduction of curtains or canopies, especially if hung well up in the air. When the Albert Hall was first used the resonance was so great that the sounds from the platform were confused. But when a canopy was stretched under the dome, so as to prevent any echo from it, a marked improvement was made; so that now it is one of the finest buildings in existence for the enlargement and conveyance of musical sounds.

The recitatives in oratorios are usually accompanied by a grand piano. As there are seats for some 7,000 persons, the instrument might seem inadequate. But it is not so. The tones are clear without being feeble. It is well known also that comparatively weak voices sound much fuller and louder there than in smaller concert-rooms, while the volume of sound from a full orchestra or the huge organ is not too great for the ample space. The best place to hear is the gallery, both for solos and choruses. This is true of most large halls where music is performed. There is little doubt that a canopy under the dome of St. Paul's would greatly assist a preacher in the nave.

The custom of stretching wires, either singly or in a net-work, across the interior of resonant buildings is of little use. And the reason is plain. Wires offer very little obstruction to the sound-waves, and do not check the vibration of the main fabric at all. If anything, they tend to increase it. At any rate, if increased in number and size, so as appreciably to obstruct sound, they would themselves vibrate in the ratio of their own tension, and produce the same sort of effect as telegraph wires, or an Æolian harp, that famous but very inferior instrument of music.

Probably the worst building in the world for confusion of sound is the chapel at Keble College, Oxford. The resonance there is so excessive that the mere movement of the foot on the floor causes a loud vibration, whilst the fall of a book produces a prolonged roar. It is quite impossible to conduct a service with proper effect. The organ makes multitudinous dissonance; the singing is mostly tumultuous discord, while the majority of preachers and readers merely cause the building to rebellow to their indistinguishable utterances. Only one man was ever well heard there in the early days of the college, and he had such a harsh voice by nature that it could hardly be said to contain a musical sound. Wires have been put up, but without effect, because wires are wholly inadequate to check vibration. What is required is tapestry on the walls and thick curtains before the doors, as well as banners in the roof. If the building was composed entirely of brick or mosaic work, it would be even more resonant than it now is. The seats and wooden roof, and the pulpit and the mosaics check vibration; but the whole structure is so compact, so excellently put together, that it responds very readily to every musical sound, and in a lesser degree to every sound. The brickwork is exceedingly good, the cement is of very fine quality, and, moreover, there is a very large wall space compared with the cubical content of the building. The best part of 80,000*l.* was spent, according to report, on this edifice, and, although the decorations are lavish and there is much beauty of detail and combination of colours, the result as a place of worship is lamentable.*

St. Paul's Cathedral in London is a difficult place for a single voice to fill. It may well be doubted whether any man could be heard from the pulpit to the west door. Canon Liddon, a master of elocution, could probably make his voice travel farther in it than any one, but he certainly could not be heard by every one in the nave if the church was full. He spoke with great deliberation, in almost a disjointed and fragmentary way, and on a very high note. But the interest of his ideas filled up the pauses between the different parts of his melodious and polished sentences, and the charm of his style kept those silent and eager who might not have been constrained by his earnestness and piety to give their whole attention to his discourses.

Ulm Cathedral, though more than 500 feet long, is easy to speak in, because the interior is diversified by beautiful carved work, and the roof is comparatively low.

The mere height of many churches interferes with their usefulness as places of public worship. St. Paul's would be better if the dome was not so lofty. Cologne Cathedral and York Minster probably exhibit the same defect.

We know historically that Savonarola preached with marvellous effect in the Duomo at Florence, but we do not know that he could be heard all over the building; and, even if so, a man can often find out how to overcome the defects of a responsive fabric such as marble, of which material most churches in Italy are built.

With regard to St. Paul's, a curious result of the shape of the building may be noticed when any one is preaching in the nave. At the circumference of the dome the voice may be inaudible to any one standing there, but on advancing down the building towards the west door, it can be heard again. This is no doubt due to the fact that the sound escapes up into the dome and is dissipated there, but being confined somewhat by the roof of the nave, it becomes appreciable to the ear, though at a greater distance from the preacher.

Another large church in which sound is easily conveyed is that of St. Mary, at Bury St. Edmunds. The distance from the lectern to the west door is more than 120 feet, something more than half the entire length, but little effort is required to render words distinctly audible at the far end. The reason why the church is satisfactory in this respect is that there are a very large number of windows in it. They adjoin one another the whole way up the body of the church on both sides, so as almost to substitute mullions and glass for solid masonry. The clerestory exhibits the same peculiarity.

When builders of the "Perpendicular" period put in their broad and lofty lights in place of the narrow Norman windows, in such buildings as Southwell Minster, besides admitting more of God's first creation, they unconsciously reduced the vibration of the structure, and rendered it more available for intelligible worship.

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* Keble College Chapel is much improved by the curtains introduced at the suggestion of the late Warden.

Paradoxical as it may appear, a building ought to be a bad conductor of sound in order to be successful in acoustics. If it is a good conductor it approaches the nature of a bell, and therefore responds readily to any musical sound.

It is a well-known fact that the pitch of a bell may be ascertained, without percussion, by sounding near it the note on which it is cast. It hums responsive to the moving air. By analogy every building will respond more readily to some particular note than any other. If this note can be ascertained, the work of the preacher is easy. It is his wisest plan to avoid this note, because his business is to make the air carry his voice without causing the building to vibrate in sympathy. A man of experience will often be able to tell at a glance what amount of sound a church can convey without being itself roused, and on what note he ought to pitch his voice. The Church of St. Mary Redcliffe, in Bristol, is large and responsive, and loud tones are not heard distinctly. But if a man pitches his voice low and speaks slowly, he can be heard easily to a considerable distance.

Instruments of percussion to be effective in concerted pieces must be damped after each note is played, or one sound runs into the next, and the result is confusion of harmony. Thus the notes of a piano are stopped by the dampers, and a drum-player checks the vibration with his hand, to prevent the sound continuing longer than it ought.

A speaker can use no damper—unless his own arguments supply the deficiency—and the only substitute he can apply is a frequent pause, to prevent one of his words tripping up another. It would be well for every preacher and reader to know the acoustic properties of the building which he uses, and one of the simplest and most effective experiments is to speak from end to end of it when empty and then full, and note the difference of style or volume required.

It will be found that many large buildings can be easily penetrated by a high note, and as a rule that a woman's voice reaches farther than a man's, because it is higher as well as clearer. Most people who have heard children speak in a theatre will have noticed with surprise with what ease little things of four and five can make themselves heard all over a large building by merely using their natural tones.

The vocal pitch of a building is not easily discovered exactly, and in general the best way to arrive at it is to station a friend as far off the speaker as possible, who will give a sign whether the latter is audible or not.

Ancient Engineering.

Mr. J. Elfreth Watkins, C.E., in an interesting article on "Ancient Engineering" in *Cassier's Magazine* (New York), quotes the following communication from Dr. William H. Dall, of the United States Geological Survey:—

> "During a visit to the Island of Jersey (Channel Islands) in 1878, while wandering over the hills, I noticed, among many dolmens scattered about, one which seemed to have never been finished. The sides stood erect, and leading up to them were inclines over which such heavy weights as the roofing slabs of the dolmens could have been raised to the positions in which we find them. It was evident that cords and rollers, with a sufficient number of sturdy savages, would have been amply sufficient for the purpose in the case before me. The thorough manner in which the clay of the inclined plane had been consolidated was evident when it was considered that the denudation of it by the elements during unknown centuries had been insufficient to noticeably reduce its level or conceal its evident purpose."

The construction of the Egyptian pyramids, Mr. Watkins considers, could have been performed by similar methods.

> Take [he says] the pyramid of Gizeh, the largest of its kind, which is approximately 150 yards high and 250 yards square at the base. In building this pyramid, which is located three miles out of Cairo, two kinds of stone were used, limestone and red granite. The limestone was quarried at El Massarah, forty-five or fifty miles from Gizeh, while the red granite was brought from Assouan, near the First Cataract, over five hundred miles. Both of these quarries were located on the river Nile. In the foreground of an illustration (given by Mr. Watkins) are to be seen rafts laden with stone blocks brought from the quarries. Upon the sloping embankment blocks are being drawn on sledges, perhaps equipped with rollers, to the highest point to which the structure has been built, the inclined plane being gradually made longer and higher with earth brought from the pits on the right and left. The highest embankment necessary when the workmen reached the top course, assuming that a twenty-per-cent. grade was adopted, would have been 750 yards long, containing about seven and a half million cubic yards, if the sides of the earth embankment would stand at an angle of thirty degrees—which is not at all improbable. Assuming that one labourer could have placed 2½ yards (about twenty barrow loads) of earth on an average each day on this embankment, ten thousand men could have built it in twelve months of twenty-five working days. It is stated that a hundred thousand men were employed for twenty years in the whole work; so that, according to this calculation, the construction of this embankment would have occupied only a small portion of the total time consumed. The false work to support the walls of the interior chambers of the pyramids could also have been made of earth rather than of timber. Heavy lumber for scaffolding must have been brought over long distances, and the framing and erection of any structure of sufficient strength to bear heavy weights would have required more skill and knowledge than the building of the pyramid itself by the method above described. In the great temple of Rameses II. is a colossal statue of that king, which equals in dimensions and exceeds in weight any other Egyptian monolith, being sixty feet high and weighing 887 tons 5½ hundredweight. It was made from a single block of red granite brought from the quarries at Assouan, 135 miles distant, by the river Nile. At Baalbec, Syria, are to be found the ruins of three temples, one of which has been given the name of Trilithon, "Three-stone-temple," from the extraordinary proportions of three of the stone blocks found in it, each being over 63 feet in length, 13 feet in height, and proportionately thick. The stones now rest in a wall over twenty feet above the present surface of the ground.

ADDRESS TO STUDENTS. Delivered by the President, Professor Aitchison, R.A., at the Sixth General Meeting, 23rd January 1899.

It is customary in this month to give an Address to Students, and it is one of the pleasantest duties the President has to perform.

The world consists of the Past, the Present, and the Future. The Past is hopeless; it cannot be altered or improved; it can only be studied. The Present, of which the practising architects are representatives, is too well known to dilate on; and the immediate Future consists of the students, and they allow us to conjure up all sorts of visions, and to delight ourselves with fancying that their works will be stamped with the perfection that ours have missed.

Aristotle tells us that most things can be equally well or better done by youth than by age; but there is one thing that age alone can give—that is, experience. I think it is a pleasure to all men of some years to convey as much of the results of their experience as they can to the young who are following in their footsteps, or are about to follow. In an art like ours it is very difficult to know what useful experience we have to impart—I mean æsthetic experience—because our views and those of the rising generation are probably different, if not opposed. I give you some remarks of Professor Cockerell to the R.A. students of my day: "That they should study all styles, for they can never tell how fashion will change, and that the style they have chosen may not be abandoned." This was said when imitation Gothic was all the rage.

I hope for an advancement of architecture which will take every one, and that, when it does come, will not be an imitation of some dead style.

At present, at least, we have no means of evoking genius, and the only means that has yet occurred to me to improve our art is by learning principles and by striving. It is true that I was found fault with by one of my hearers on a former occasion for not invoking the aid of the Almighty; but it seemed to me then, as it does now, that my business is to say as far as I can what earthly methods, and what earthly methods only, have the chance of improving us.

There is one thing I have remarked—that all the sciences and arts seem to go in cycles, or, as we should say, are mounted on Fortune's wheel, and, as it turns, one art or science is at the top of the wheel while the other is in the mud, and as it goes round the positions are reversed. It is not very easy to trace the cause of these epochs, but we can safely say that, at the present moment, the epoch is that of the application of science, and is on the top of the wheel, while architecture is very low down. When these epochs occur, the whole atmosphere is, as it were, full of the desire for excellence in the particular art or science then coming into vogue, as a knowledge of Roman architecture was at the time of the Italian Renaissance. At such times men of the most transcendent abilities have an ambition to succeed in the new fashion, even though it promise but little wealth, and very often nothing but the escape from starvation, even if it offer that. Milton's was in England a poetic age, though he got for his *Paradise Lost* little more than the price of waste paper; but he at least got an immortality of more than 200 years, and we know not how many more centuries he will last and be studied; while poor Otway, the author of the once admired *Venice Preserved*, who lived in the same century, is said to have died of starvation; and, though he was popular in his time, I am afraid there are few but professed students of dramatic literature who have ever read a line of his. A great incentive to any kind of study or achievement is that of being thought highly of by your contemporaries, though there is a higher stimulus in the hope of that sort of immortality which mortals can attain.

One of these inducements at the present time is impossible to be looked for—I mean the admiration of your fellow-men; for who knows or cares whether your work is good, bad, or indifferent?—except perhaps a brother architect. I do not know if the sort of limited immortality any one can get has ever been obtained by those who have not been admired by their contemporaries; at any rate, it has not commonly been the case. Yet we hear all the unsuccessful votaries of the fine arts saying, that though their works may not be appreciated now, they will be appreciated by posterity. I have admired architecture I have casually seen, without knowing the name of the architect, or whether he were alive, and thought this was by a good man, which I hope, if he is dead, may be some satisfaction to his manes. Architecture, at least in good times, does not so much represent the proclivities of the artist as the general aspirations of the people; for, though the great artist seems only to portray his own ideas, he must, if popular, do admirably what every one desires to do himself, in spite of Dr. Johnson's attempted refutation of Boswell's remark that "the poet only says what every man thinks and would say": "Then, sir, according to you, the poet is only the tailor of other men's thoughts." At any rate, architecture must have conveyed to the minds of the people when it was built the sort of effect that they desired, for models were mostly made for approval before the building was done, while to future generations it clearly speaks of the taste and inclination of the age in which it was produced: it shows the genius and knowledge of the architect and the skill and care of the workmen, so that if a ruin is seen, or a considerable architectural fragment is found, we cannot help forming a strong opinion of the taste, skill, and proclivities of that age.

I think I have pretty well expressed the indifference of the present age to architecture, so that you cannot expect much honour or reverence on account of your work, or that it will cause much pleasure or delight to the living beholders. It becomes questionable whether there is enough stimulant to attract men who possess the intellectual faculties necessary for producing fine architecture—I mean such architecture as will be admired for two or three thousand years. I hope that my observation has been wrong as to the chances of immortality for those whose works are disregarded by their contemporaries, for if the architect is really before his time, he should be recognised by those that come afterwards. I cannot even give that sort of encouragement to the students that used to be given me when I was a boy—that all men had equal abilities, and the great man was merely distinguished by greater perseverance and industry, although it is quite clear that extraordinary industry and perseverance are the concomitants of genius. I think I understate the case if I say that one considerable architectural genius is to be found among 100,000 of the inhabitants of any highly civilised country. To be a great architect involves a capacity for acquiring the higher branches of mathematics and to be able to use them; to comprehend at least that branch of Natural Philosophy that is called Statics, and even to advance beyond the point at which it has then arrived; to so arrange a building as not only to fit it for its purpose, but to put it in a shape that will command the admiration of skilled and cultivated beholders, and to invest the finished structure with a capability of exciting emotions that are proper to its use. Architecturally this is brought about by simplicity, by perfection of proportion, by outline, by the proper disposition of light and shade, and by size and mass. To the former qualifications of the architect must be added the capacity of knowing what additional interest can be given to important parts by sculpture, and how colour can be properly applied to the whole structure. Of course it would be infinitely better for the architect to possess the whole of these qualifications; I do not know whether this was ever the case, though Sir Christopher Wren very closely approached it. We know that in whatever excellent qualities the Renaissance architects were deficient, they were mostly sculptors or painters. Where they were deficient was in construction, in invention, and in the proper expression of their buildings.

According to Mr. Ruskin, all the architects of the world since Greek times were sculptors, and the sculptors thought, like Mr. Ruskin, that pure architecture was ridiculously easy, or came naturally to all men. I think that he was conversant with the history of the Renaissance architects, who were undoubtedly sculptors or painters, and applied these qualifications to the Greek and Mediæval architects; but, as far as I can find out, there is not the slightest ground for believing it true of the Mediævals. His Excellency Monsieur Jusserand tells us of a monk who was allowed to have a nude model to make studies from for a crucifix, but we have not the slightest hint that he was an architect as well; and the note-book of Wilars de Honecort, whom we know to have been an able architect, does not impress us by his sketches with the idea of his being a competent sculptor or painter. Some profound students of Greek literature would probably be able to confirm or deny the hypothesis that all the Greek architects were sculptors; but considering that we do not know that Phidias was an architect, it seems unlikely that the great architects were sculptors or that the great sculptors were architects. Aristotle was a great admirer of architectural art, and any one bent on knowing whether the architects were sculptors as well, might find indications of it by reading through his voluminous works to that end. Plato was evidently conversant with the craftsmen of his time, but I do not recollect any suggestion of his that the Greek architects were sculptors. We know from Trajan's letter to the younger Pliny that the Roman architects were mostly got from Greece, but we do not know whether they were sculptors as well.

Most of you probably know that Pascal considered architecture a progressive art, and we all know that it did progress most rapidly in constructive skill, from the end of Romanesque days through Gothic times almost to the very end, and that it also changed its æsthetic expression several times.

I think all of us desire to see architecture progress more especially in æsthetic expression.

Since the application to building of cast iron, wrought iron, and steel, the engineers have surpassed even the wildest imagination of sixty years ago. The Britannia Tubular Bridge is, as far as I recollect, 500-feet span, but Sir Benjamin Baker has made a span of the Forth Bridge over 1,700 feet. It is very unlikely that any architectural work would require a span of more than a tenth of that bearing, and that supposes an extension of more than double the span of the largest groined vault of the Romans, which was only about 80 feet. Still we must to a certain extent look for the advancement of architecture in a nicer adjustment of the mass to its height and to the weight to be carried, and to the form to be given to the supports for the weights and strains that come on each particular piece. In the use of iron and steel architects are very much handicapped, first on account of the slenderness of proportion which, as a rule, renders them unfit to compose with weaker materials, but mainly on account of the little resistance these materials offer to the action of fire, unless they are protected by fireclay and terra-cotta; and when they are so protected they very nearly assimilate in size to the supports of old-world structures. Still, as I have so often said before, I think if the Mediæval architects had possessed these materials and been able to work them as we can, they certainly would not have abstained from using them, as architects of the present day have mostly done. What visions does the use of cast iron raise in our minds as to the possible size and height of buildings! What new forms and shapes does not cast iron suggest when we know that it will take any form we please and any ornaments that can be cast! What visions of colour does it not evoke when it may be made resplendent with enamel!

No one can say that convenience in planning is not greatly studied in the present day, but this convenience has mostly been of the purest utilitarian sort: it has been a question of how the accommodation wanted can be packed anyhow, which should not be the aim of architectural planning, which now, alas! is hardly thought of. The other thing to be aimed at is to give expression to the thoughts, cultivation, and aspirations of the present day, a subject that requires the deepest study and a perspicacity that is rare; for, though we are quite certain that many buildings have not got the proper expression, it is not so easy to say how the proper expression should be got. We have ransacked all the civilised architecture of the past and made collections of it for use, but we have certainly not applied the examples with discretion. The delicate ornaments and suggestive sculpture that were applied to the embellishment of the boudoirs and pleasure-houses of Renaissance beauties, is now lavished on oyster-shops, public-houses, and clothiers' warehouses, on which fluttering cupids are out of place, and the magnificence and stateliness of the palaces of great nobles now deck stores or hotels. We can at once pronounce these to be absurd, but we can hardly lay down a rule for the right expression which should be applied to the immense variety of buildings that are erected; for although we are familiar with the term "playful" applied to some buildings by the architects of two generations ago, we hardly know in what that playfulness consisted.

We must not forget the effects of association. Pediments were only found on temples during the Roman Republic, and Cicero expected to see them in heaven. Gothic with us is mostly associated with cathedrals and churches, and is therefore looked on by the public as a holy style. This, of course, is absurd, for the style in vogue was always used indifferently for all sorts of structures, when there was a style; but the architects did not bestow the same character on a coal-store or a tinker's shop as they did on a cathedral, and when the outside of a building shows what is wanted in the inside, the cathedral and the tinker's shop will not be quite alike, nor should the tinker's shop be decked with the same enrichments as the cathedral.

You know that architecture is the most difficult of the visual fine arts, yet there is much more labour spent on learning painting and sculpture than there is on learning architecture, and the votaries of these fine arts commonly have more natural aptitude to start with. We know the painful years students of painting and sculpture devote to getting the groundwork of their art, while from three to five years spent in an office, mostly in tracing, is thought enough for an architect.

Although I do not think that the test of examination is a very complete one, it is better than nothing; but yet the profession generally thinks even this too much, and utterly declines to start a more complete one for Fellows, being afraid that a knowledge of the elements of architecture may damp the ardour of Genius or clip its wings; while almost all the other professions have examinations for the two classes, and have consequently advanced at a much more rapid rate.

There are two points to which I beg to draw your particular attention—first, that architecture is a structural art, and that all an architect can do, as an architect, is to build: in his structures he has to show his knowledge, taste and skill, his learning, morals, cultivation, and aspirations. The Mediæval architects in their ecclesiastical buildings showed their hopes and adoration by lanterns, towers, and spires, by lofty naves, daring construction, and intricate patterns. When we have arrived at their pitch of knowledge and skill we must show our parts, inventions, and aspirations in similar ways, not as they did with almost pure geometrical figures, but with more graceful, refined, and daring work. Secondly, to point out the comparative scarcity of the use of coloured and glazed materials for external facings where the greatest beauty of colour and form may be used. It is refreshing even to think of London and other manufacturing towns presenting us with beautifully coloured and enriched fronts, that do not want painting every year, and would render such towns cheerful, if not delightful, to look on, in the place of the dingy, sooty, and depressing houses faced with stone, brick, or plaster; and this would not only raise our spirits under our leaden skies and drizzling rain, but be more healthful, for glazed pottery absorbs but little moisture, and is easily cleansed from soot and dust.

I am glad to see that we have admitted ladies to the Associateship, for that allows us to avail ourselves of the abilities of at least another half of the population, and, if you will pardon the bull, the larger half, as well as to offer a small meed of justice to the fair sex.

REVIEW OF WORKS SUBMITTED FOR PRIZES AND STUDENTSHIPS 1899.

By Beresford Pite [*F.*].

THE students' competitions in Design at the Royal Institute have some importance and general value beyond the interest of the subjects dealt with or of the individuality of their authors. When the subjects are of general interest, as is the case this year; and, as we are also glad to note, when the number of competitors is ample and sufficient to afford a comparative exhibition, a review is presented of the development, not only of the results of architectural education, but of the operation of those elements which are moulding the progress of the art of design in building. In the competitions for the Soane Medallion and the Tite Prize nineteen designs have been submitted, all, without much qualification, the work of students having adequate training in preparing sets of drawings for such competitions. There are among so many designs evidences of stray influences and of some enthusiasms, but owing probably to the generally monumental character of the two subjects, a Concert-Hall and a Royal Mausoleum, the works as a whole enable a fair estimate to be formed of the paths which the study of design in England is taking.

There is a manifest desire to return to classic tradition in both these subjects—that is, to the standards of design in mass and detail that were current before the Romanticism of the Gothic and Queen Anne revivals coloured the dreams of young and old architects alike. But the return to the once discarded pathway is neither direct nor comfortable, and the halting recognition of the force of traditions which have been transgressed with impunity, suggests a confession of failure almost of the nature of a penance, certainly a pilgrimage without the joy of a sketching excursion and without much hope or energy in imaginative effort.

The designs for the Concert Hall that seem to indicate this somewhat pessimistic attitude, and can be classed as unwilling if not unhappy designs, are, mentioning them alphabetically, "Ben Marcato," "Cecilia," "Civitali," "Honor," "Lion-Rampant," "Si je puis," and "Sol fa." "Ben Marcato" accepts the inevitable with the best *sangfroid*, and therefore seems to obtain the award; the external dignity, the single, great, and fairly proportioned order, supported by wings of subsidiary scale, make the design what it is; while the disregard of constructional expression, the building up of such enormous features as the attached columns of the peristyle, and the return entablatures, without any basis in the plan or constructive scheme, are symptoms of that road to architectural ruin which once led from Regent Street to Regent's Park. These columns should be hollow, as they stand on cross girders and thin walls, and the entablature should for the same reason be a shell in lengths of about forty feet. Stucco is the inevitable outcome of taking up the Victorian classic tradition where it was dropped a generation ago. The pursuit of architectural study abroad, and especially with regard to the plan and arrangements of concert-rooms, can safely be recommended to the successful student.

Other designs return to the traditional classic style, with traces of a freer influence as to detail and composition, but in almost every case without a sufficient sense of symmetrical propriety or of dignity of proportion. "Si je puis" is wrong where he is free—the license which cuts a semicircular arch into two parts with a pier under its keystone, and divides the colonnade below a pediment in the centre, is freedom in weakness. This design has care in its plan and some dignity of arrangement in the elevations, but has no architectural character worthily developed.

"Lion Rampant" has more evidences of life, perhaps some excess of it (which was the complaint of which Dr. John Brown's little dog died). The breadth of treatment internally and externally and the beautiful draughtsmanship of the detail drawing should be commended, and the tendency to originality a little chastened.

"Cecilia" carefully brings somewhat of the Georgian feeling into the classic treatment of her design, and has a too severely square plan and very large rounded pediments to express it in elevation; the general scale of detail is rather small, but the use of large freely-drawn swag ornament may be commended.

"Honor's" domical antechamber will illustrate to students the truth that an architectural imaginative idea needs embodiment in the facts of the building; that Pegasus must be ridden by the poet, not harnessed in front of his vehicle, or he may kick it into insignificance.

"Sol fa" needs connection both of idea and of parts. A boldly corbelled gallery as the attic of his front is supported over a deeply-recessed arcade from which projects a porte cochère, an arrangement of ideas which is contradictory.

Though grouped with the traditional classicists, "Civitali" occupies a position nearer satisfactory originality and acceptance of traditional proportions, but in common with the foregoing authors is suffering from the almost complete lack during the past era of a systematic study of classic proportion. The design is broad, and the concentration of interest satisfactory, but the composition of the parts is ignorant. Students of classic architecture, if they would achieve success apart from mere archæologic reproduction, must undertake the groundwork of the orders otherwise than as mere "testimonies of study"—which have not been studied. Sir William Chambers's text-book and system should be assimilated and studied, and beauty of parts sought after rather than originality.

There is another group of designs for the Soane competition that merit attention as a whole. They are neither Gothic nor Queen Anne, but are certainly Romantic. The avoidance of architectural traditional forms is now earnestly advocated as essential to the regeneration of current building art. The doctrine shows a healthy reaction against the deadness of reproduced detail; it has a field of its own in whitened country houses; and perfectly simple restrained design can be cultivated without much difficulty in such cases. Room is being made for this teaching in ecclesiastical work, but there it threatens an affectation of crudeness and barbarism that tends to defeat its first principles.

For *beauty* as an element in a building, detail from such craftsmen as the figure-carver and metal-worker is requisitioned, the architect merely modelling his walls suitably to his abstract ideas of mass and scale—if he has any. In the illustration of such work even architectural draughtsmanship is discounted, and the most sketchy method is deemed the best, for the purpose of emphasising that the building is more than the drawing. Texture of surface, beauty of material, and what may be called personal detail, are essential to success, and it is hoped that with these qualities architecture, as she is taught, can be dispensed with.

The application of these principles to a student's design is of course an anomaly; a student's design should not exist. The building only is architecture in its material and craftsmanship.

The appearance of a group of four designs in this competition more or less based upon these general ideas is a matter of some importance; they are by "The Itinerant Architect," "Lohengrin," "Olive Green," and, with some partial qualification, "Swan."

Of these, the first named is the most important, and expresses with considerable ability the principles of the new school. The drawings are sketchy, but evidence reserve of power, and have directness of line. Detail is abnegated architecturally; beauty of form is confined to figure panels combining between the windows to band the design together; a primitive colonnade is formed of shafts dividing upper windows; shallow projections give vertical emphasis and some sense of surface; while the whole outline is kept in subdued masses without cornice or change of line. The roof is flat, as is also the ceiling; the interior is well thought out, and the organ frontage and internal scheme for decoration would make the hall one of the best in the series.

The success of this design as a building is rightly intended to depend upon its mass, but material would be nearly as important an element in its success. What could this be in London? Stock brick is beautiful where it is appropriate; here it would not be. I can only imagine a suggestion and offer it seriously to the talented author of this design, that the whole should be banded in black and white glazed brick in about the proportions of the use of black and white marble in Florentine buildings, and that the panels of ornament should be of coloured ceramic ware.

"Lohengrin" attempts to follow the same doctrine, but with less success and comprehension of its purport. St. Mark's, Venice, the interior of which is a Mecca for architects, unfortunately possesses external dome roofs of wonderful quaintness, but of no architectural or doctrinal connection with the purity of its interior. Mr. Ruskin had to shut his eyes to them when contemplating the façade. But they have inconsiderately invaded the imagination of "Lohengrin," and his ogee roof cases are really contrary to his faith. This set of drawings is characterised by other affectations, as the elevations are inked-in freehand, and that without gain of feeling or correctness.

"Olive Green" employs some current forms for mouldings and cornices, but has originality and success in his groupings; the decorative details, however, are bad, and in a case where it is the more essential that they should be good. The student should rather leave out carved ornament than put it in badly.

"Swan" is broad and original, and with a proper consideration of the case employs definite Renaissance detail which is good of its sort for the portico annexe; the central grouping of columns is, however, a mistake. The general proportions, which are not practically illustrated by a perspective from too high a point of sight, are free from architectural connection, and the portico has a too detached appearance. It might have afforded a good foil if the building had been in the same key, but that would have committed the author to architecture which generally was to be avoided.

The TITE PRIZE is won by "Red Rose" with a design modest in size—perhaps even small, but illustrated in powerful drawings. It is, perhaps, a question whether lofty proportions are not lost in so small an interior, and whether the emphasis of vertical lines is valuable below a dome. Free Classic, later Renaissance, restrained Spanish, and similar terms will convey the position that the author holds as to style. It is doubtful Italian. But Italian travel to Mr. Fulton will be fruitful of reward.

"Memoria" has a largeness of feeling, spaciousness of proportion, and completeness of plan that make the design notable. The obelisks have an altogether appropriate suggestiveness, and are truly original. Attention should be given to the details of this design—I think the best submitted this year.

"Petronius," "Memento mori," "Imperial" and "En Avant," all show more or less original dome treatments, and worthily compete with each other in partial developments of the fascinating study of dome design.

"Rex" has drawn pleasant inspiration from the early Italian Renaissance masters, as from Bramante's Santa Maria delle Grazie at Milan (of which an interesting sketch by the late Professor Hayter Lewis hangs in this room), and from Brunelleschi's chapel in the cloisters of Santa Croce at Florence.

"Endeavour" has resorted to the early classical tradition, derived from the mausoleum at Halicarnassus, and has treated it in a modern and somewhat economical way, shown in successful drawings.

The GRISSELL MEDAL competition is adequate to its interesting subject of a Fruit Market for a small town. The successful design by "Simplex" possesses in addition to its constructional faces, some architectural appropriateness. It is to be regretted that the design by "Artichoke," which has a very pleasant and English idea of the subject, should be without sufficient constructive quality.

The DRAWINGS MEDAL has been awarded in a way that will indicate to students the vast importance of having a fine subject. The north porch of St. Paul's lends itself admirably to fine draughtsmanship. Fine draughtsmanship with fine design are irresistible at the Institute. St. Catharine's, Cambridge, is an excellent survey soundly worked out, carefully shown, of a most interesting building which places the whole profession under a debt of gratitude to the surveyor. Southwold Church has been beautifully illustrated in fine line Gothic drawings. St. Michael's, Linlithgow, is a work of the same class, while Moreton and Riddlesden Halls are interesting surveys.

For the PUGIN STUDENTSHIP there has been a remarkably fine competition this year; it is awarded to an omnibus collection of Gothic studies, mostly English: glass, decorated screens, inked-in sketches, and measured drawings. A second award has been given to a magnificent set of drawings of the north and west porches of Chartres Cathedral; while a well-known name marks an interesting set of drawings of the church at Norrey, near Caen, St. Ouen, at Rouen, and the Hôtel de Valois, Caen.

For the OWEN-JONES competition a fine set of archæological studies has been sent in, comprising mosaics of the Cappella Palatina, drawings of S. Maria dei Miracoli, Venice, S. Anastasia, Verona, and of some screen-work at Southwold. The colour is archaic, the mosaic and pavement design is interesting, the fresco hangings are faded, the stained-glass colour needs the light, and the heraldic colour has other meanings. But the Owen-Jones Studentship is for the study of colour as colour, not merely for the accidentals of a pavement and stained-glass composition.

The sketches hanging in the room exhibited by the Aldwinckle Student of last year, Mr. Fulton, deserve careful attention—there is a singular decorative quality in his work, and a peculiar force of line and of grouping with a view to pictorial effect which should be noted. Whether this is an altogether satisfactory method of architectural study one cannot well say; but there can be little doubt as to the eventual success of a student who has produced these studies.

Mr. De Gruchy's Pugin drawings are worthy of attention, as they indicate a strong development in the direction of freedom by a student whose work has been marked by closeness and accuracy of study heretofore.

Mr. Lee's Tite studies are also to be commended.

NOTE ON THE PLANNING OF CONCERT-ROOMS,

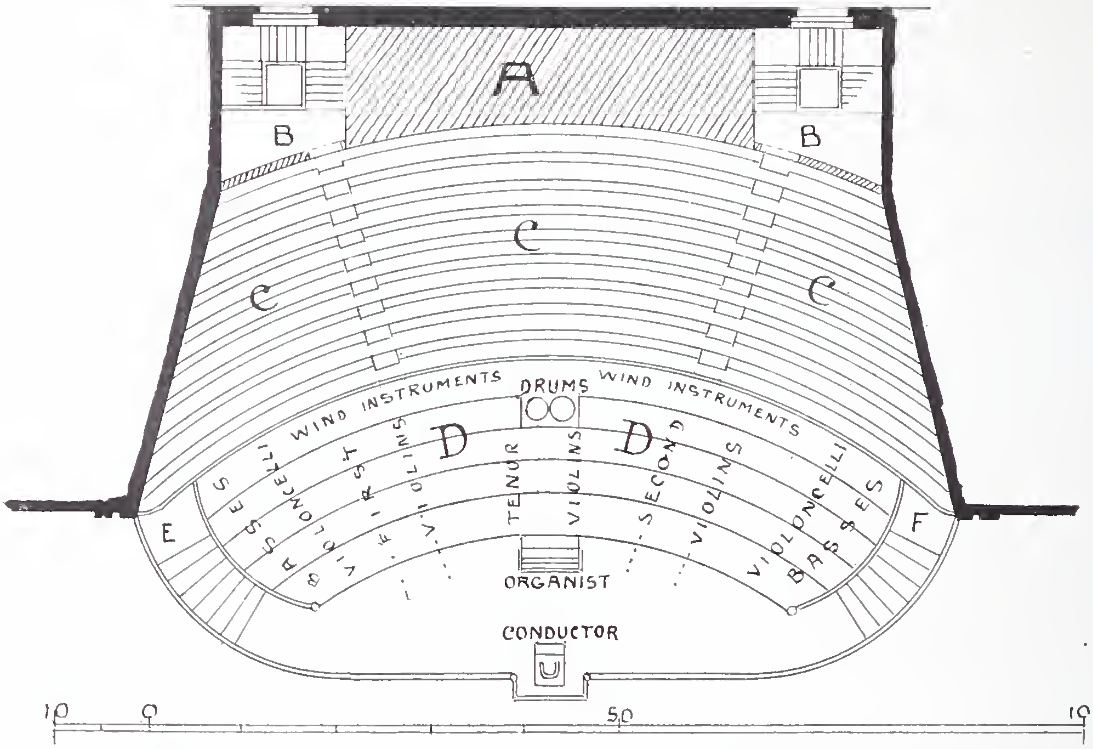
WITH REFERENCE TO THE SUBJECT SET FOR THE SOANE MEDALLION.

By H. Heathcote Statham [*F.*].

IN connection with the subject of the Soane Medallion, I propose to offer a few practical suggestions in regard to the planning of concert-rooms, more especially in respect to the organ and orchestra. But in the first place I would call attention to two points in regard to the general construction of concert-rooms. Where it is intended that such a room should be also available for balls or receptions, a flat floor is of course a necessity; but, for a room which is to be used as a concert-room only, the main floor should always be formed with a gradual slope upwards from front to back. A perfectly flat floor is always a bad position for hearing the performers who are on a raised platform. There has been no concert-room in London so good for hearing band and choral music on a large scale as the old Exeter Hall, where the line of seating was carried upwards in one unbroken slope to the back of the hall. Wagner adopted the same method in his Bayreuth theatre, which, though not a beautiful building architecturally, is a very practical one. Secondly, it should be borne in mind that all expanses of smooth, unbroken wall-surface, whether at the sides or end of the room, whether straight or curved on plan, are undesirable, as tending to produce a disturbing echo. The object in a concert-room is that the sound as first produced should reach the ears of the hearers with as little impediment as possible, but that, once heard, it should not be reflected back to them again. Wall-spaces behind or at the side of the audience, therefore, should be architecturally treated so as to be broken up into facets, and thus to break up and distribute the echo in different directions, instead of permitting it to concentrate. This is especially the case in regard to the end wall of the room, which if left flat will send back a very decided echo; while if built on a general curved plan it will be likely to focus an echo at the point which forms the centre of the curve.

To come now to the question of the orchestra and the organ. I observe that in the plan to which the Medal has been awarded, the seats for the chorus are shown arranged in straight lines at right angles to the axis of the house. That is a mistake. The usual arrangement of the seats in a segment of a circle is done for practical reasons. In the first place, it is desirable that the chorus-singers should stand so as all to look towards the conductor, so that they can see the movement of his bâton by merely raising their eyes from the music, without turning the head. Secondly, it is desirable that the one side of the chorus should be able to hear the other side, which is impossible if they are all placed in a straight line—those at one side will then only hear themselves and their near neighbours. If the two sides face partially towards each other they will hear each other, and that is an assistance in keeping time together. It is not necessary or desirable that the curve should be developed, as it occasionally has been, to a semicircle—in that case, part of the singers will not be singing sufficiently towards the audience; a segment of a circle meets all requirements best.

In more than one of the plans submitted, the band is provided for on a level space at the foot of the chorus seats. That would never do; the players at the back would not properly see the conductor, nor would he have sufficient control over them, nor would the instruments placed at the back be sufficiently heard by the audience. The band require to be raised on successive steps, like the chorus; but not of quite the same section. The chorus require 2 feet 6 inches width for each rank, from back to front, and a rise of about 1 foot 3 inches in each step, so that each rank may sing over the heads of those in front of them. The band steps should be considerably wider—say 3 feet 2 inches—and do not require so high a rise; we may say 8 inches rise for the lowest step, and 2 inches added to the rise for each successive step. The greater width is necessary because the bulk of the band are string-players, who require space to move their arms and their bows.



A. Organ.	D. Band.
B. Stairs for chorus.	E. Entrance for solo performers.
C. Chorus.	F. Entrance for band.

(Entrances at E and F under front of chorus stage.)

I have given here an imaginary plan of an orchestra for a concert-room of large size, arranged for a band of about one hundred (the numbers of the band vary a little, as extra instruments are sometimes required which are not ordinarily wanted), and for a chorus of 400. The side walls are shown expanding from back to front, which should always be done in one way or another. They may be on a concave plan or a convex plan, or (as here) in straight lines; but they should always expand towards the auditorium. The space for the band might have been provided with one step less, and making it the same width as the chorus stage; but it is better not to expand the band too much laterally, as the basses in a large band are nearly always divided and placed at opposite sides, and as they have nevertheless to play together they must not be separated by too great a distance. It would perhaps be better in this plan if another step had been added, and the width of the whole further reduced.

The approximate positions of the instruments are indicated on the plan. The basses, or *contrabassi*, and the violoncellos, are usually divided, as indicated, at each side of the orchestra; some conductors prefer to group the violoncellos more in the centre, but the arrangement here indicated is the more usual. The first violins, of which in a band of this size there would be fifteen or sixteen, are grouped to the left of the conductor, the second violins (of equal number) in a corresponding position on his right, and the tenor violins, or *violas*, in the centre. It will thus be seen that the principal portion of the orchestra is occupied by the stringed instruments. The wind instruments, which do not require the same degree of action in playing, take up much less room, and are all ranged on the top tier behind the strings; their average number may be taken as about seventeen, but allowance must be made for three or four more, as occasionally required.* The centre portion of the top tier should be projected out, as shown, to make standing-room for the kettledrums, two large copper bowls about 2 feet 6 inches and 2 feet diameter. Another form of drum (the "bass drum") may be wanted, but not always, and a temporary stand will do for that; but the kettledrums are indispensable, and are always put in the same position, viz., in the centre of the top tier, directly facing the conductor—also for a practical reason, for the sound of the drum is so dominating that if the drummer is the least out of time he sets everyone else wrong; therefore he is put where he has the most intimate relation with the conductor. And as this requirement is invariable, it is best to provide for it specially.

I have shown a dividing rail or fence between band and chorus. This is very seldom done, but it is much better to have such a distinct line of demarcation. It is not well to have a couple of brass instruments, for instance, pushed up into one of the ranks of the chorus and putting the singers out by playing close to their ears; it is better to confine the band to its own quarters, allowing space enough (as is done here) for a little elasticity in numbers. The entrances for the solo performers and the band are shown at E and F respectively. On the plan adopted here it was necessary to have steps down, to get headway under the front of the chorus stage, where the entry is situated. But it may be observed that it is much better, when circumstances admit of it, to have the access from the green-room to the platform entirely level—no steps anywhere; and especially no single step in an unexpected position, a stumble on which might spoil a player's nerve just as he was going before the audience.

Now we come to the important question of the organ. In the first place, none of the Soane competitors except one ("Olive Green") appear to have any notion of the space and height required for a modern concert organ. An organ of the size which is required for the performance of modern music must occupy a space of some 300 square feet, and weighs some twenty tons or upwards (without counting the bellows). It will thus be recognised that the idea that you can hang such an instrument on a wall wherever it is most out of the way is hardly a practical one. Moreover, it must have height enough to allow for a thirty-two-foot pipe above the level of the sound-board on which the pipes stand. It is only the pedal pipes which run to this height, and where an organ is built from the floor, the pedal sound-board may be placed at a lower level than the others; but where the organ is built out as a projection carried on girders, the thirty-two feet height is a necessity, allowing also three or four feet more for the "action" and the foot or "boot" of the pipe.

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* The average complement of wind instruments to provide for is as follows: two flutes, two oboes, two clarionets, two bassoons, four horns, two trumpets, and three trombones. Occasionally there may be in addition a piccolo flute, a contrabassoon, a tuba, and four trumpets instead of two. The players of all these require no more than ordinary seat-room side by side, only not so close as to elbow each other; they cannot, for instance, be packed as closely as the chorus-singers.—H.H.S.

The scheme of carrying the organ out overhead has become fashionable lately, but it is anything but good for the effect of the instrument. The Queen's Hall organ, which is essentially a fine one, is ruined in its effect by that position, which in that case may be said to have been only a kind of makeshift to get space out of a totally inadequate orchestra plan. A large organ has far more effect when placed in a low situation and assisted by the resonance of the floor. If, however, the organ is built as a kind of promontory projecting into the chorus seats, there is the disadvantage that the compactness of the chorus is broken into, and the singers on each side of the organ are in a kind of nook by themselves, and not in a position to keep their place properly in the general effect. I consider therefore that the best solution of the problem is that which I have shown in this plan—to place the organ as the backing of the whole orchestra, utilising the space at each side of it for the chorus staircases. These staircases would be covered in immediately above the doorway; the partitions might be architecturally connected with the organ-case design by a cornice run right across, and above that level the sides of the organ would stand free. The bellows, for an organ of this size, should be provided for in a lower story.

One word about the position of the organist. As long as organs could only be played by long wooden slips ("trackers") connecting the key with the wind-valve, it was important to get the player near the organ, to reduce the length of the trackers and their tendency to lengthen and shorten with changes of temperature. But now that pneumatic or electric action can be used there is no excuse for putting the player where he cannot hear the effect of the instrument, and (more especially) where he cannot hear its effect as combining with the band and chorus, when the organ is used to accompany them. In the present day the organ-player ought never to be put at this disadvantage both to himself and others: and I have shown the organ key-board where from henceforth it ought to be—placed in front of the band and facing the conductor's desk, so that the player can hear what he is doing, and can also see the conductor without the aid of a reflector; with the modern resources of mechanism there is no occasion for the player to face the instrument and turn his back on conductor and audience; he can sit facing the hall just as well as the other way, and it is therefore absurd to keep up, from mere habit, a disadvantage of position which is no longer necessary.

DR. USSING ON VITRUVIUS.

DR. USSING'S "Observations" on Vitruvius * contain a re-statement, at greater length and with additional arguments, of a thesis propounded more than half a century ago by Councillor C. F. L. Schultz, a friend and correspondent of Goethe.

The gist of this thesis is that what we know as "Vitruvius *de Architectura*" was not written, as it purports to be, by an architect of that name in the time of Augustus, but is a forgery of a later date. Schultz's pamphlet is not so elaborate in its critical animadversions on Vitruvius as the pamphlet now before us, but in certain respects it is broader and more satisfactory, because less purely negative in its treatment. Schultz does give his readers some intelligible positive theory to account for the phenomena in question, while Dr. Ussing brings forward arguments of many different degrees of value against the orthodox view of the *de Architectura*, without elaborating any counter theory of his own, or even bestowing attention on the points which tell most against his case.

From a writer of Dr. Ussing's position architectural readers will expect something more than this. They are not interested in mere academic controversies, such as those that used to be carried on among scholars of older generations, but, when a question like this of the authenticity of Vitruvius has been raised, they are ready to listen to any level-headed scholar who has investigated it on all sides, and who will present the whole case in a clear and candid manner. They will wish to know, in the first place, how the balance is to be struck after a dispassionate review of the arguments, while, if the balance turns against the received view, they will go on to ask what alternative theory can be set up in its stead. By the "received view" is not meant any exaggerated estimate of the value of the *de Architectura*. The architect of to-day no longer makes a Bible of his Vitruvius, but on the contrary tends to depreciate him unduly; and an attempt was made in the JOURNAL of 1893 (Vol. IX. N.S. p. 353 *ff.*) to discover how much there was of genuine actuality and interest in the famous treatise. It appeared then that there was a great deal in Vitruvius that was hardly in place in an architectural work, or was historically valueless; but that there was on the other hand a large amount of technical and historical matter of the highest importance, which the modern architect could not afford to ignore. When and by whom this matter was put together is a question of practical moment, and on this Dr. Ussing does not give us all the assistance we should desire.

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* Observations on *Vitruvii de Architectura Libri Decem*, with special regard to the time at which this work was written, by J. L. Ussing, Ph.D., LL.D. [*Hon. Corr. M.*], late Professor of Greek and Latin in the University of Copenhagen. 4o. Lond. 1898. [R.I.B.A., 9, Conduit Street.]

In the opening pages of the pamphlet we are told, in words which perhaps say a little more than the writer means, that Schultz's observations "were so conclusive that no further evidence was needed" (p. 2), and that "he has done enough to decide the question." Schultz's view may be summed up as follows.* The *de Architectura* is, according to him, a compilation out of various fragments made about the time of the Emperor Theodosius, that is, in the latter part of the fourth century A.D. These fragments were for the most part Greek, and were translated into Latin by the compiler, who had no proper comprehension either of the matter or the language. At a subsequent date the name "Vitruvius" was attached to the matter thus collected, while at a final stage the work was put into its present form about the tenth century, probably by Gerbert, Archbishop of Cologne. The name "Vitruvius," Schultz says, was known and honoured as that of a practical architect and engineer of repute in the early days of the Empire. Such a practitioner is mentioned by Frontinus at the end of the first century A.D., and by Servius and Sidonius Apollinaris at later dates, but in the fourth century little save his name was known about him, and it was accordingly possible for this name to be annexed for the benefit of the compilation, which thus received a *cachet* of age as well as of authority. If it is asked: What about Pliny's mention and use of Vitruvius and the *de Architectura?* Schultz has the following reply: He was clear-sighted enough to discern the force of the evidence for the genuineness of Vitruvius arising from the fact that a certain part of Pliny's *Natural History* is almost exactly the same as parts of the *de Architectura*, while Pliny mentions "Vitruvius" as one of the authors from whom he drew the matter of his work; but he got over the difficulty by adopting a suggestion, current at his time, that the sections in Pliny where these sources are mentioned were not genuine.

Such is in brief the theory of Councillor Schultz, and Dr. Ussing has now modified it by giving up the suggested tenth-century epoch, which the date of existing manuscripts shows to be impossible, while he agrees in assigning the period of about the fourth century A.D. for the substantial fabric of the work. This he believes to have been made up principally from the Latin writer Varro, who belongs to the last age of the Republic, by some one who "was no real architect, only a man who took an interest in architecture and kindred branches, who had read something about these matters, and now fancied himself to be a wise man and able to teach others" (p. 13). The various arguments used in support of this thesis need not yet be followed in detail, because there are certain broad preliminary questions which must be faced. Here are one or two of these:—

Dr. Ussing accepts as genuine the notices in Pliny that make "Vitruvius" one of his sources. The importance of this is that the real Vitruvius is proved by Pliny's reference to have been a writer, *auctor*, whereas Schultz, on the evidence of Frontinus, had held this real Vitruvius to have been a practical man and not a writer at all. "Pliny," writes Dr. Ussing, "knows an author of the name of Vitruvius. . . . The question is whether this is the same Vitruvius as ours" (p. 20). The above sentence is an illustration of what cannot but be regarded as a defective method of treatment in the pamphlet. The writer gives no sign that he realises the importance of this question, and the enormous difficulty which here confronts anyone who argues that our Vitruvius is a forgery. Pliny cites a writer "Vitruvius," and his *Natural History* contains matter which we also find in our Vitruvius. Dr. Ussing apparently wishes us to believe that Pliny did use, somewhere in his work, the writings of a Vitruvius, but that these writings themselves have perished without leaving a trace, while our Vitruvius—that is, the fourth-century one—at a later date annexed some of Pliny's matter, and so brought about the resemblance. Now it is clear that, as Schultz admitted, the borrowing of the name "Vitruvius" for the compilation of the fourth century showed that it was a known and honoured one, while Pliny tells us that there were writings connected with this name. Dr. Ussing's view assumes that these writings, although the writings of a man of lasting repute, perished absolutely without leaving a trace in the interval between the age of Augustus and that of Theodosius. What political, social, or literary reason can be alleged for such a phenomenon? There were Greek and Latin libraries at Rome on the Palatine, in the Forum of Trajan, and in other parts of the city, and these institutions increased so in numbers as time went on that we are informed in the *Notitia* of the fourth century that Rome contained at that time no fewer than twenty-eight (Jordan, *Topographie der Stadt Rom*, II. 181).

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* Schultz's essay is published as an appendix to a volume of correspondence between him and Goethe [*Briefwechsel zwischen Goethe und Staatsrath Schultz*, Leipzig, 1852–6], and it is commented on unfavourably in the preface and notes to F. von Reber's German translation of Vitruvius, Stuttgart, 1865.

If the real Vitruvius of the days of Augustus had left writings we may be sure that copies would have been safe in these collections, and in that case such an impudent piece of forgery as that postulated could not have been carried through with success. On page 29 it is admitted that Servius, at the end of the fourth century, had either read the "more ancient genuine author of this name" (Vitruvius), or had access to quotations from him. If the real Vitruvius was known in either of these ways, the borrowing at about this period of the "older well-known name" (p. 42) for a supposititious work would have been a very hazardous experiment. It must be borne in mind that the literary life of Rome had been unbroken during the Imperial period. No cataclysm had yet occurred to make a break in the traditions of culture, and the loss of any Augustan writer of importance cannot be assumed without doing violence to common sense. Schultz was more canny when he suggested that the name "Vitruvius" was not claimed by the compiler of the fourth century, but became attached later on to the treatise in the really Dark Ages that followed on Alaric's sack of Rome in the beginning of the fifth.

Another general argument of very great force in favour of the authenticity of the *de Architectura*, is the fact that Roman Imperial architecture, as evidenced in the monuments from the time of Augustus downwards, has left no trace of itself in the treatise. Oddly enough, Dr. Ussing uses this fact as one of his arguments *against* the authenticity of Vitruvius. The buildings mentioned in the ten books seem as a rule, he points out (pp. 12, 13), to be of the time of the Republic or the very beginning of the Empire; and in his final summary (p. 42) he says, "It is incomprehensible that a Roman who wrote about architecture at the time of Augustus did not allude with a single word to the marvels of architecture constructed at that period, and that if he wanted illustrations he did not choose them among the works that were known and admired by everybody, instead of referring to buildings from the time of the Republic."

The most obvious explanation of this phenomenon is that which any reader can derive from Vitruvius's own words in the exordium to his book, translated and commented on, perhaps rather hypercritically, by Dr. Ussing on page 9 of his pamphlet. Vitruvius writes there as if he had had his treatise substantially prepared some time before its actual publication, but had withheld it till the stormy period of his patron's life was over—"I did not venture, in the midst of such grave business, to come forward with my work about architecture, which I had executed with great efforts of thought," &c. (Vit. trans. by Ussing, p. 9, note). Assuming the *bona fides* of those personal indications about the author scattered up and down the *de Architectura*, we should see in Vitruvius a man belonging essentially to the old order of things, one "who stood still and looked rather back than forward" (JOURNAL, vol. ix. N.S. p. 362), and had no interest in the new departure in architectural matters of the first age of the Empire. Dr. Ussing explains the matter, however, in a different fashion. He believes that the writer of the treatise *De Architectura*—or, as we may conveniently call him, pseudo-Vitruvius—living about the fourth century, modelled his book "on a work which was written before the reign of Augustus" (p. 42). We do not know exactly what process Dr. Ussing understands by the words "modelled on," but his theory seems to involve the ollowing dilemma. If the ten books consist in the main in a transcript from a work of the Republican period, what becomes of the argument from language relied on in the early part of the pamphlet? Surely, on the hypothesis of a transcript, the language as well as the matter would be of the Republican time. If, on the other hand, pseudo-Vitruvius only worked up the old material into a new form and expressed it in his own language, how does he manage to avoid revealing "with a single word" his knowledge of all the structures and processes of the Imperial period? And, furthermore, how does he succeed in writing long passages about technical processes of work in plaster and other materials without betraying his amateur status? It is to be noted that Schultz cleverly evaded this dilemma by making the authorities used by pseudo-Vitruvius *Greek* and not *Latin*, so that the matter would remain old while the language of the translator was modern. The form in which Dr. Ussing has cast his hypothesis makes it more difficult to sustain; and we are forced here to try and figure to ourselves in some intelligible fashion what sort of a person this pseudo-Vitruvius can have been. Dr. Ussing has touched off his portrait in a few not very flattering phrases. He is "a shallow-minded, ignorant man" (p. 1); an "impostor" (p. 11); "no real architect, but confessedly an amateur who had read some books about these matters, and therefore considered himself called upon to teach others" (p. 42); and, on the showing of Schultz, "an ignorant humbug" (p. 2), and "neither a real architect nor a technical expert, but a closet philosopher" (p. 3). On the other hand, he is admitted to be "an ancient author, though not from the time specially designated as classical; a man who had seen a good deal we cannot see; and, above all, a man who had sources which we have not" (p. 1); while "it is by no means impossible that he may have had something to do with the construction of catapults and similar engines of war—not for Cæsar and Augustus, but some centuries later" (p. 41). Such a man proceeds, in the time, perhaps, of Constantine or one of his immediate successors, to write a "manual about his profession," for the sake of teaching others (p. 13), and takes cunning measures to make it succeed, so that it might be "seized upon with avidity, and its publication might prove a lucrative business" (p. 42). In furtherance of this laudable intention he takes out his Varro, and indites from this authority a compendium of architecture in which nothing about the building art is allowed to appear that could have any practical interest for the men of his own time. These men, of course, possessed their own copies of Varro, and if they desired antiquarian knowledge as to old processes of Roman building, they could turn to these or look out the rolls of this author in the numerous public libraries. They would not be very likely to seize with avidity on a *réchauffé* of this matter of wholly bygone interest, especially when its real source, as well as the device by which "Vitruvian" authority was being claimed for it, were perfectly patent to the public gaze. Such a production would have been laughed out of existence as soon as it appeared, instead of being handed down in so many copies that at the time of the Carolingian Renaissance it was one of the most prominent items of classical literature. It must be remembered that at the supposed epoch of pseudo-Vitruvius there was renewed activity in the building arts, owing to the foundation of the new capital at Byzantium. Constantine encouraged architects, of whom, in one of his latest edicts, he says "there is great need" (*decreta*, ed. Migne, p. 381); and a writer of the time who wished for success would have put some actuality into his work by dealing with the monuments and processes which really belonged to the epoch. Imagine a compendium of architecture for use in the fourth century which makes no mention of vault construction or the use of concrete on a large scale, or of veneering brick or rubble structures with marble slabs, or again of such all-important edifices as the great *thermæ* that were being erected till the later age of the Empire. If pseudo-Vitruvius "had seen a good deal we cannot see," he makes singularly little use for the benefit of posterity of the advantage he enjoyed.

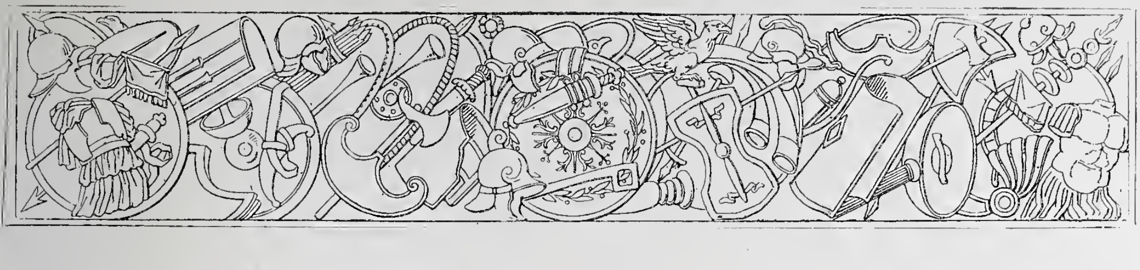
The argument of Dr. Ussing that we are here examining may thus be seen to turn against himself. If it is remarkable that an Augustan writer should say nothing about Roman Imperial architecture, it would be simply a portent in a writer of the fourth century, unless he had a particular intention of keeping silence. That there can have been no such intention, but on the contrary a strong motive in the other direction, we have just seen. To sum up then. If the writer in question gave a sort of transcript of Varro, or any other Latin writer of repute of the last age of the Republic, three things would have happened: first, he would have been found out; secondly, he would have defeated the only intelligible object of his book; thirdly, he would have written early Latin. If, on the other hand, he had some independence in his writing, he must have managed with extraordinary cleverness to avoid letting out what he and everyone else at his time must have known about Roman buildings, and to have carried through technical descriptions, like some of those in the seventh book, without betraying himself as a closet philosopher. Everyone knows how difficult it would be for a mere ignorant amateur to avoid doing this.

The perfect impossibility of this creature of a dream--the supposed pseudo-Vitruvius of the fourth century—does not, however, make the figure of our old friend the Augustan Vitruvius an easy one to understand. All must here acknowledge with gratitude the valuable work which Dr. Ussing has accomplished in his pamphlet for Vitruvian criticism. If in this review his points have not been taken up formally one by one, it is because, as has been explained, there seemed to be larger questions of a more general bearing which had to be faced before time could be profitably spent on minor arguments. It is proper to say here that these arguments have been taken into consideration and due weight given to them, though there is not space to enter into any detailed discussion. Many of these arguments are drawn from mistakes, omissions, confusions, inconsequences, of which the author of the *de Architectura* is undoubtedly guilty. It is obvious that only those cases are available for the support of the thesis in which the particular sin is more likely to have been committed in the fourth century A.D. than before the first. If "everybody" called the first Emperor "Augustus," [though Horace did not always do it (p. 10)], why does not pseudo-Vitruvius use the term? If "it is altogether impossible that a man who has served under Cæsar could have given a description of the siege of Massilia which is quite contradictory to the detailed report given about this event by Cæsar himself" (p. 41), there would be the same impossibility in the case of a later writer, who had, like every Roman, Cæsar's Commentaries easily accessible, if not in the very closet where he philosophised. On grounds like these some of Dr. Ussing's arguments may be discounted, but there remain several that have undoubted value, though there is no one of them that is, as the Germans say, "*schlagend*"—carrying on its very face an impression of its force. What is meant by such an argument may be illustrated incidentally from the pamphlet before us. For fixing the date of Athenæus in the Roman Imperial period, the writer refers (p. 30) to one of his expressions, "*the excellent laws of the Empire*." It need hardly be said that Athenæus, who wrote in Greek, did not use the word "*Empire*," but the term actually employed; *ἡγεμονία* is the technical Greek equivalent, and is so suggestive of a reference to Rome that one accepts it at once as going a very long way towards proving the Roman date of the *περὶ μηχανημάτων*. It cannot be said that there is any one of the arguments in favour of a late date for Vitruvius that comes home to the mind with anything like this same convincing force. Singly, many have their point, and the cumulative effect of them is not to be ignored; but they hardly weigh in the balance against the broader considerations upon the other side, some of which have now been indicated. The arguments from language are in some cases striking, but, on grounds admitted on pages 2 and 8, not by any means conclusive. On the question of style one may be allowed to say that the passage quoted on page 9 does not seem fairly describable as "coarse and out of taste." Vitruvius does not write with the terseness and elegance of Horace, but what he says seems under the circumstances natural enough, while the imperfect tense, which, in the note on page 10, is said to have "scarcely any sense," is, on the interpretation of the passage given above, exactly in place. The criticism of Vitruvius's account of the Greek theatre on page 17 has its edge turned by a recent paper in the German Archæological Institute's *Athenische Mittheilungen* 1897, in which Dr. Dörpfeld, on the ground of new observations, justifies Vitruvius even at the expense of his own theory detailed in his book on the subject. That Servius quotes from "Vitruvius" a passage not found in the *de Architectura* is certainly a puzzling fact.

Dr. Ussing may fairly claim that all his arguments should be discussed *seriatim* before a judgment is pronounced on his thesis, and, in so far as it has been impossible in the present review to accomplish this, the treatment of the subject has been incomplete. On the other hand, a dispassionate investigator might hesitate to embark on an elaborate examination of details so long as such obvious difficulties as those referred to above have not been fairly met and grappled with. In any case, Dr. Ussing's work will always retain a very high value for Vitruvian students, on account of the searching criticism to which he has subjected this interesting but very puzzling ancient writer.

G. Baldwin Brown.

Edinburgh.



SOME OLD ITALIAN BUILDING ACCOUNTS.

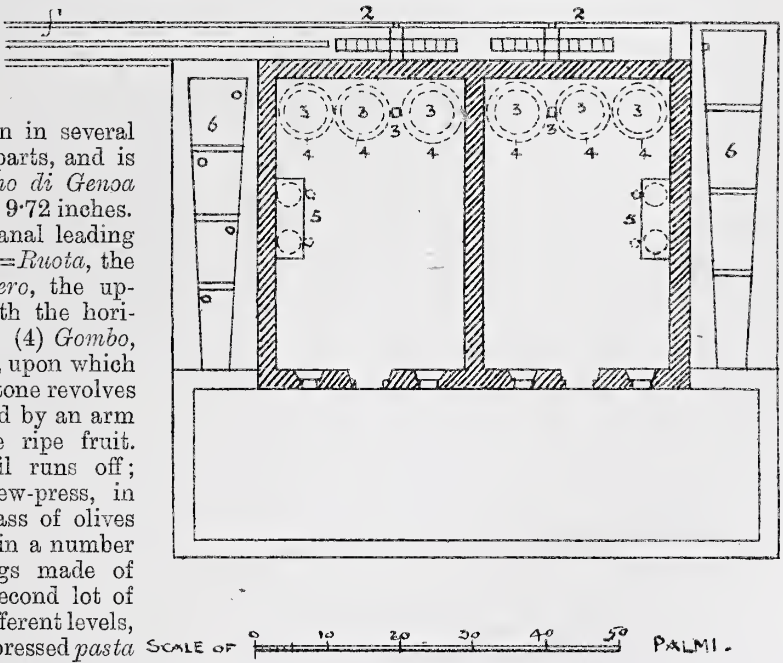
By William Scott,

Qualified as Associate 1870, *Silver Medallist* 1875, *Soane Medallist* 1877, *R.A. Travelling Student* 1878.

(Continued from p. 249, Vol. V. Third Series.)

IN these old documents are found so many references to the *defisi*, the oil-mills, that it may be worth while to give a plan copied from a document of S. Biaggio, accompanying an application for the right to take water from the torrent to work the mill. I have added reference numbers for the sake of explanation, and so the various features will be made clear. The original plan, here reproduced, is drawn in several colours, indicating the several parts, and is to a scale of *Palmi*; the *Palmo di Genoa* being equal to 25 centimetres, or 9·72 inches.

(1) *Bearo* or *Beale*, a small canal leading the water on to the (2) *Roda*=*Ruota*, the water-wheel; (3) *Arboro*=*Albero*, the upright shaft or axis connected with the horizontal shaft *Paillajo* or *Travo*; (4) *Gombo*, the lower or "nether" millstone, upon which the *Mora*=*Molla* or upper millstone revolves in a vertical plane, being moved by an arm on the shaft, and crushes the ripe fruit. From this *gombo* the first oil runs off; (5) *Destrento*=*Torchio* or screw-press, in which the *pasta* or crushed mass of olives taken from the *gombo*, packed in a number of *sportini*, small circular bags made of rushes, is pressed to get the second lot of oil; (6) *Laghi*, small vats, at different levels, where the already crushed and pressed *pasta* is washed to give a further yield of oil. Sometimes there is, in addition, a *Pairolo* or boiler, where the *pasta* undergoes yet another operation; and modern science has taught that fermentation may also be used to increase the yield. Even after all these processes, the refuse is very useful for fuel.



PLAN OF OIL MILL.

Most of the mills are still constructed and worked in precisely the same way as they were hundreds of years ago, and the same technical terms are used. The mill itself, that is, the mechanical portion, is called a *Frantojo*, and the *Frantojani* or constructors—a special class of workmen—are well paid for their labour; while in such an autumn as the present one, for instance, when the *annata* or year's yield promises to be exceptionally good, they are almost overwhelmed with commissions.

Among other account-book entries which refer to details of construction and their cost, &c., we have:—

p. fare serchare uno instrumento di quando mr simone larberto ha venduto lo defisio* ha maestro lucha he esso un strumẽto del 1593 nelli acti di mr pele-	For searching for a deed (document) by which (lit. when) maestro Simone Amalberto sold the mill* to maestro Luca; it is a deed of 1593, among the

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* That is, a half share, see p. 250, Vol. V.

grino maccario spesso soldi quatro	£0 4 0	deeds of maestro Pelegrino Maccario; spent four *soldi*	£0 4 0
p fare tirare un arboreto allo defisio p li homini cioè quindici ha soldi diexe per homo vale	£7 10 0	For bringing a tree to the mill, for the men, that is, fifteen at ten *soldi* per man amounts to	£7 10 0
ha maestro bernardino per sua manifatura dello arboreto cõ suo figlio dato lire sei dico	£6 0 0	To maestro Bernardino for his labour on the tree, with his son, given six *lire*	£6 0 0

Then in 1662 is another entry:—

per ciodi da rovere et 100 da barcha vechia *	£4 0 0	For nails for oak and 100 spikes *	£4 0 0
per andarli a comprare	£0 8 0	For going to buy them	£0 8 0
per drissare li ciodi vechi	£0 6 0	For straightening the old nails	£0 6 0
per l' arboro †	£21 1 0	For the shaft †	£21 0 0
per una giornata per far abasar larboro et martelar il gombo	£1 0 0	For a day's work in lowering the shaft and hammer-dressing (or levelling) the mill-stone	£1 0 0
per un travo	£0 6 0	For a beam (?)	£0 6 0
per 8 denti	£0 6 0	For 8 teeth (for a wheel)	£0 6 0

And in 1689:—

per fare ha comodare il defisio de Università ‡ di roda albero copi ciavaxine § cercio altinelo et Maistranza di ogni cosa e giornate d'homini per spesa di lie (lire)	47, sodi 10	For repairing the mill of the University ‡ with a wheel, shaft, wheel-float-boards, *ciavaxine*, § iron hoop to the bucket, and the labour for each item, and men's time to the cost of *lire*	47, *soldi* 10

Besides S. Biaggio and Soldano, there is in the same valley another village, Vallecrosia, conserving documents of interest. Here the influence of the priests may again be traced, at least as much as elsewhere, in the direction of obtaining the expenditure of public money for their own purposes. In 1652 is entered:—

Al Rev^{do} Rettore p. acconciare la canonica	£5 0 0	To the Rev. the Rector for repairing the Canon's residence	£5 0 0

But three years later a more important work was decided on; and the accounts include a regular contract with a builder to construct a new Canon's residence:—

E statto deliberata p. fabricare la casa Canonicale in publica collega p. Pietro curto e Bertolomeo aprosio Consoli con conseglio consenso et intervento de cinq desei ufficiali . . . (here follow their names) . . . e d^{ti} ufficiali l' hanno deliberata a Pietro Maria Cassino sotto li patti modi e forme e conditioni, come di sotto in lib. (lire) £276 cioe ched^{to} Cassino sia obligato metergli a sue spezze mattoni per la volta due millia osia tanti tovi ‖ che faccino d^{to} lavoro fabricare la muraglia verso monte un palmo e mezo con suo fondamento d' incima in fondo, fare sua volta ad^{ta} Cassa alta nel mezo palmi 19 cõ sue scale e bancheti, ¶ alsare tutte le muraglie dal battume sino alli travi dieci palmi, fare suoi spiggi, sua tromba, ** dare suo battume, et infrancarla di greggio, coprire d^{ta} Cassa, e cõprare coppi se vi mancherañо p. coprirla, le taole del tetto quelle che vi sono metterle spezze, se vi mancherañо metterle l' una da l' altra due o tre ditta, et ãcora mettere asue spezze ogni sorte di legnami che farañо di bissognio p. d^{ta} fabrica e darla finita di greggio con cond^{e} che fra messi tre sia fornita e se nõ sarà fornita d^{o} Cassino debba paghare a sue spezze la piggione al Curato eq^{to} in presenza di fra^{co} Aprosio q. Bertolameo e di fra^{co} Aprosio d' Ant^{o} testimonij e di me deputato (signed) Gio Agos^{to} Aprosio deputato	It has been resolved in public assembly by Pietro Curto and Bartolomeo Aprosio, consuls, with the advice, consent, and intervention of five out of the six officials (councillors) . . . to build the Canon's residence; and the said officials have voted it (the house) to Pietro Maria Cassino under the contract, ways, forms, and conditions as [indicated] below at 276 *lire*, that is, that the said Cassino be bound to supply at his own cost bricks for the vault No. 2000, or as many *tovi* ‖ as are necessary for the said work; to build the wall [on the side] towards the hill 1½ palms [thick] from top to bottom, with its foundation; to construct the vaulting to the said house 19 palms high in the middle, with its stairs and treads ¶; to raise (carry up) all the walls [to a height of] ten palms from the floor to the beams, form its angles (arises), its space under the stairway, ** provide its pavement, and roughly plaster it (the house); to cover the said house and buy tiles, if any are wanting, for covering it: the boards of the roof which there are must be placed close together, or if they be insufficient lay them two or three fingers' width apart; and besides provide at his own cost every kind of timber that may be necessary for the said building, and give it over finished in the rough, with the condition that it be given over within three months; and if it be not so given over the said Cassino shall pay at his own cost the rent of the curate; and this in the presence of Francesco Aprosio, son of Bartolomeo, and of Francesco Aprosio, son of Antonio, witnesses, and of myself, a deputy. (Signed, &c.)

This expenditure for the carcass was followed by another for the joiners' work:—

1656 li 19 febraro in Vallecrosia Spezze fatte a Luca Aprosio Cassiere delib. per spezze p. taule travetti e maestranza p. fare porte e finestre nella Casa Canoni-	1656, February 19, in Vallecrosia. Payment made by Luca Aprosio, Treasurer [according to] resolution: By payment for boards, scantlings, and workman-

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* *Da barcha vechia* (lit. old boat) is a familiar but very curious *patois* term, the origin of which seems to be quite unknown. It signifies a nail with a very large head, and in explaining to me the sort of nail indicated by this term I was told they were "such as are seen on the crucifix (!)" I have chosen what I thought the nearest English equivalent, but should be glad of any suggestions tending to throw light on the subject.—W. S.

† Lit. tree, but it doubtless means the tree as wrought into a shaft.

‡ See Vol. V. p. 250.

§ The meaning is uncertain; in this case it probably refers to small pieces of ironwork, but it might mean the repositories for the refuse.

‖ *Tovi* = small blocks of light spongy tufa, used instead of bricks for making the vaulting.

¶ A curious idiomatic expression still used, the word *banchetto* meaning also a seat.

** Impossible to translate literally, as *Tromba* means simply a trumpet.

cale e per due annatte al Canceliere nr̃o rationale £27 9 0 dico libre vẽti sette e soldi 9 che in tutto d^{te} spezze sono £190 18 0	ship in making doors and windows for the Canon's residence, and for two years' [salary] to the clerk our accountant £27 9 0 Say twenty-seven *lire* and nine *soldi*, which payments altogether amount to £190 18 0

Note the quaint way of mixing up two sets of accounts.

For some reason or other this house does not seem to have satisfied the requirements of the authorities, as we find in 1659 a resolution declaring the necessity for constructing a new Casa Canonicale, and noting the faculty obtained from the *Magistrato della Communità* for expending money to the extent of 50 *scuti argento*, as well as to *permutare e vendere* the existing residence. Following on this it is announced that after mature deliberation the Councillors have determined, and determine, upon the erection of a new Canonica, spending to the extent of 200 *lire genoese*, and attached to their resolution is a condition that, if there should arise any opposition to such an expenditure of public money, fresh provision must be made.

Ready cash not being available, the Treasurer is furnished with the names of a number of individuals who are debtors to the Commune, in sums varying from 12 *lire* to 33 *lire* each, and he is authorised to summon them before the *Capitano* at Ventimiglia, and enforce payment of their debts.

There are several entries of permission given to private individuals to build against the Town-wall, or to vault over the space between the same and their existing houses, for a money payment. As an example of the latter, in 1683, we are told the consuls:—

hanno venduto uno arẽbamento (= arrendamento) de muraglia de l'università a Fr^{co} Aprosio q. Gio. per il pretio di lire vinti sei	Have given (lit. sold) a lease of the wall of the university to Francesco Aprosio, son of Giovanni, at the price of twenty-six *lire*.

To this lease was attached the curious condition:—

che debba in ogni occasione di guerra lasciar la porta aperta accioche le persone possano intrare e uscire per difesa di d^{to} luogo e lasciare ancora le archebugiere pero colla muraglia sottana . . . &c.	That he shall on every occasion of war leave the door open so that persons may go in and out for the defence of the said place, and shall leave the loopholes open in the lower wall . . . &c.

Apricale, an extremely picturesque village at some distance from these last, furnishes us with a report by two experts on repairs at the Campanile in 1747, which shows how works were measured and valued at that date. After the usual formal oath, it proceeds to record how the two experts:—

Doppo aver ben bene e dilligent^{e} visitate esaminate e cañate de nove riparaz^{ni} hanno riconosciuto esservi cañe di Muraglia numero sessanta e speso p. cad^{a} caña salm^{te} † una e meza calce vale lire due, Salmate otto sabia che p. il porto di essa si è speso lire una, giornate due da Mr̃o da Mr̃o che a sdi Trenta il gño sone lire Tre, servitù di d^{i} mr̃i p. cad^{a} caña una lira e cinque, e finalm^{e} Tovi ‡ cad^{a} caña lire due rillevante jn tutto . . . § cad^{a} canna a lire nove e soldi cinque, ed il Tottale di d^{e} cañe a lire cinque £555 cento cinquanta cinque, di corde rubbi due a lire sette cad^{o} £14 rubbo sono £14, di Ferro p. rondini e chiavi di essi rj quindeci a lire Tre, soldi sei e den^{i} otto—sono £50 lire cinquanta, di chiodi no. due Milla £26 di valore lire ventisei. La Croce di ferro esser di valore £15 di lire quindeci, di tavole Donzine quatro di lire cinque cad^{a} donzina, sono lire £20 venti e Finalm^{e} esservi impiegati travi n^{o} sei a lire Tre soldi sei e den^{i} otto rillev^{te} £20 lire venti E questo d^{i} mri da Muro Pisano e Tamagno riferiscono secondo la practica e perizia anno di simili estimazioni, e secondo Iddio e sua (sic) £700 conscienza, &c., &c.	After having well and diligently visited, examined, and measured the new repairs, have recognised that there are No. sixty *canne* of walling, and the cost of each *canna* is—one and a half loads † of lime, cost two *lire*; eight loads of sand, the carriage of which cost one *lira*; two days of a mason, which at thirty *soldi* per day are three *lire*; labourers' help for each *canna*, one *lira* five *soldi*; and finally for *Tovi* ‡ to each *canna*, two *lire*; amounting in all . . . § for each *canna* to nine *lire* and five *soldi*, and the total of the said *canne* to five hundred £555 and fifty-five *lire*. Two *rubi* of cord at seven *lire* each £14 *rubo* are £14. Iron for tie-rods and keys for the same, 15 *rubi* at 3 *lire* six *soldi* and eight *denari* make £50 fifty *lire*. No. two thousand nails worth £26 twenty-six *lire*. The iron Cross is of the £15 value of fifteen *lire*. Four dozen boards at five *lire* each £20 dozen make twenty *lire*, and finally there were used No. six beams at three *lire* six *soldi* and eight *denari*, amounting to £20 twenty *lire*. And this the master masons, Pisano and Tamagno, report according to the experience and skill (or knowledge) which they have in similar estimates and according to God and £700 their conscience, &c.

Here we have a fresh term, *salmate*, for mule-loads; and the sale of boards by the dozen. The latter term I have not hitherto found in any other similar document. We may also note the *canna* as the unit of cubic measurement, and remember that its equivalent, the *cannella*, is used to-day for the purchase of stone, and in some parts also for measuring up works as above. It varies somewhat in different parts of the country; but in general is equal to 5½ cubic metres. The *canna* is now a measure of length only, and equals three metres or four *braccia*. At Perinaldo, in the last century, the word *cannella* was already in use:—

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† *Salmata*, a mule-load.

‡ See note, p. 156.

§ Word indecipherable.

Piu per compra di pietre in canelle no. 8½ a £5 cad^{a} canella.*	Also for purchase of stone in No. 8½ *cannelle* at £5 each *cannella*.*

Another document, without date, but on paper bearing the kind of stamp used at the close of last century, also refers to repairs at the Parish Church, and these may have been rather extensive, as it was found advisable to make a kiln on purpose to burn the lime :—

Notta delle spese fatte dai Sig^{ri} Sindaci della Coñta d'Apricale Gio. Battã Pisano e Gio Battã Viale in vantaggio della Chiesa Parochiale di d^{o} Luogo del denaro bilanciato dall' Ill^{mo} Sig Intend^{e} nel loro Caosato. Primieramente hanno pagato al Capo Mastro Gio Batt. Cornetto p. aver visitato la Parochia secondo l' ord^{e} dell' Ill^{mo} Sig Intend^{e} incluse le spese cibarie £8 0 0	Note of the expenditure made by the Signori Sindaci of the Community of Apricale, Gio. Batt. Pisano, and Gio. Batt. Viale, for the benefit of the parish church of the said place, of the money approved by the Most Illustrious Sig. Intendente in their Estimate. First, they have paid to the Master-builder, Gio. Batt. Cornetto, for having examined the parish church according to the order of the Most Illustrious Sig. Intendente, including their expenses for food £8 0 0
piu anno pagato ad Ambroggio Cassino mandato dal conseglio di d^{o} Luogo in Nizza p. ottenere la licenza di fare una fornace di Calcina p. riparazione di d^{a} Chiesa incluse le spese della sup^{ca} £5 8 4	Also they have paid to Ambroggio Cassino, [who was] sent by the Council of the said place to Nice to obtain a license to make a lime-kiln for the repairing of the said church, including the cost of the application (lit. petition) £5 8 4
piu anno pagato al Ferraro di Perinaldo p. far aggiustare 3 masse da pietra p. romper le pietre di d^{a} fornace £5 10 0	Also they have paid to the blacksmith at Perinaldo for putting in order three sledge-hammers for breaking stone for the said furnace £5 10 0
piu anno pagato a Mastro Christofa p. aver fatto la volta della d^{a} fornace, ed impiegato giorni sette a cuocerla £18 0 0	Also they have paid to Master Christofa for having constructed the vault of the furnace, and employed seven days in firing it £18 0 0
piu anno pagato a quatro uomini che anno fatto li denti † della fornace £1 0 0	Also they have paid to four men who made the *denti* † of the furnace £1 0 0
per vino e pane comprato p. dare al mastro et alli uomini che anno assistito a fare la volta sud^{a} anno speso £1 10 0	For wine and bread bought to give to the mason and to the men who assisted in making the said vault they have spent £1 10 0
piu per aver comprato rubi 12 di ferro p. fare li rondini e chiavi ad una parte della volta della Chiesa £33 0 0	For having bought 12 *rubi* of iron to make the tie-rods and keys for a part of the vaulting of the church £33 0 0
piu anno pagato ad un uomo che ha portato li Tiletti per farli affigere in Nizza Dolc'acqua et altri Luoghi £2 3 4	Also they have paid to a man who carried the notices to have them put up in Nice, Dolceacqua, and other places £2 3 4
piu anno pagato a tre uomini per giorni sette che anno assistito a cuocere la Fornace £6 3 4	Also they have paid to three men for seven days that they have assisted in firing the kiln £6 3 4
per aver comprato due ceste da far tirar le pietre picole e due maniche p. le masse da pietra anno speso £1 7 0	For having bought two baskets for carrying the small stones and two handles for the sledge-hammers they have spent £1 7 0
piu anno speso per una quarta ‡ nissole rotte regalate al Sig^{r} Conte Sclarandi p. esservi portato col Sigr Ingegniere Gavella alla visita della Chiesa sud^{a} £5 0 0	Also they have spent for a *carta* ‡ of cracked nuts presented to Signor Conte Sclarandi for having come with the Signor Engineer Gavella to examine the said church £5 0 0
piu anno pagato p una caña ciape comprata p riparare l'acqua sop^{a} una parte del coperto della Chiesa £3 0 0	Also they have paid for a *canna* of slates bought for keeping out the water on a part of the roof of the church £3 0 0
A Mastro Bartolomeo Caciotto p una giornata impiegata a riparare l'acqua sop^{a} d^{o} coperto et a due uomini che anno assistito d^{o} Mastro anno speso £2 5 0	To Master Bartolomeo Caciotto for one day employed in repairing (lit. keeping out the water) the said roof, and to two men who have assisted the said mason, they have spent £2 5 0
piu anno pagato ad un Mastro e due uomini che anno assistito p riparare una camera grande dove si è riposta la calcina della Parochia £3 10 0	Also they have paid to a mason and two men who have assisted in repairing a large room where the lime for the church has been kept £3 10 0
£95 17 0	£95 17 0
(Signed) P. Lud^{co} Rebaudi Prevosto	(Signed)

In coming down towards our own times, we have begun to find the term "engineer" among these documents, and there is at Bordighera a contract about a statue, in the year 1715, from which a portion may be quoted to show how two branches of art-work were there united in a way made familiar by several great names :—

". . . io Giacomo Ant^{o} Ponzanelli q. Giovanni Scultore ed Architetto prometto ed obligo verso li SS^{ri} Pietro Piana e Bart^{o} Ballauchi Deputati all' infrascrite cose di terminare il groppo di marmo consignatomi rapresentante S^{ta} Maria Madalena per colocarsi al suo luogo destinato nella Chiesa Parrochiale del luogo della Bordighera. . . ."	". . . I, Giacomo Ant^{o} Ponzanelli, son of Giovanni, Sculptor and Architect, promise and engage towards the Signori Pietro Piana and Bartolomeo Ballauchi, Deputies, for the under-mentioned matters, to complete the marble group consigned to me, representing S. Mary Magdalene, to be placed in its destined position in the parish church of the town of Bordighera. . . ."

The price agreed upon was 300 *filippi*,§ to be paid on the completion of the work, and, in addition, the cost of travelling, living, &c., for assisting at the placing of the statue in position.

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* A *cannella* of rough stone for walling is now worth 6½ *lire* at the quarry.

† The stones forming the mouth of the furnace.

‡ *Quarta* = *carta*, a measure still in use, especially fo the sale of olives, and with a capacity of 20 litres.

§ A *filippo* was equal to 5 *lire* 12 *soldi*.

INCORP. 1837 1887

9, Conduit Street, London, W., 28*th January* 1899.

CHRONICLE.

THE PRIZES AND STUDENTSHIPS 1899.

The Council's Deed of Award read Monday, 16th January.

To the Business General Meeting.

Gentlemen,—Pursuant to the terms of By-law 66, that the Council shall, by a Deed or Writing under the Common Seal, award the Prizes and Studentships of the year, and announce such awards at the next General Meeting after the adjudication, the Council have the honour to state that they have examined the several works submitted for the two Silver Medals of the Royal Institute, the Soane Medallion, the Pugin and Owen Jones Studentships, the Godwin Bursary, the Tite Prize, and the Grissell Gold Medal.

The Royal Institute Silver Medals.

(i.) *The Essay Medal and £26. 5s.*

Seven Essays on the Use and Value of Colour in Architecture were received for the Silver Medal under the following mottoes :—

1. " Aucassin."
2. " C'est une fée qui prodigue le bien ou le mal."
3. Gloire de Dijon.
4. " Ian."
5. " Non quo sed quo modo."
6. " Satis verborum."
7. " Spectrum."

The Council have awarded the Silver Medal and Twenty-five Guineas to the author of the Essay bearing the motto " Spectrum ";* a Prize of Books to the value of Five Pounds to the author of the Essay under motto " C'est une fée qui prodigue le bien ou le mal,"† and Certificates of Honourable Mention to the authors of the Essays bearing the mottoes " Aucassin,"‡ " Gloire de Dijon,"§ and " Non quo sed quo modo."‖

(ii.) *The Measured Drawings Medal and £10. 10s.*

Six sets of Drawings were sent in, of the several buildings enumerated, and under motto, as follows :—

1. " Nomen "—Moreton Old Hall, Cheshire.
2. " Non vi sed sæpe "—St. Catharine's College, Cambridge.
3. " Nox "—Southwold Church, Suffolk.
4. " Pitti "—St. Michael's Church, Linlithgow.
5. " Sulphur "—Riddlesden Hall, Keighley.
6. " Wren "—St. Paul's Cathedral.

The Council have awarded the Silver Medal and Ten Guineas to the delineator of St. Paul's Cathedral, submitted under the motto of " Wren,"¶ and Medals of Merit and Five Guineas to the delineators of St. Catharine's College, Cambridge, under motto of " Non vi sed sæpe,"** and Southwold Church under motto of " Nox,"†† respectively.

The Travelling Studentships.

(i.) *The Soane Medallion and £100.*

Eleven Designs for a Concert Hall were submitted, under the following mottoes :—

1. " Ben Marcato."
2. " Cecilia."
3. " Civitali."
4. " Honor."
5. " Itinerant Architect."
6. " Lion Rampant."
7. " Lohengrin."
8. " Olive Green."
9. " Si je puis."
10. " Sol-fa."
11. " Swan."

The Council have awarded the Medallion to the author of the design bearing the motto " Ben Marcato,"‡‡ with the sum of One Hundred Pounds for architectural study abroad during a period of not less than six months, under the specified conditions.

(ii.) *The Pugin Studentship and £40.*

Eleven applications were received for the Pugin Studentship from the following gentlemen :—

1. R. C. Austin (London).
2. E. H. Bennett (London).
3. Benjamin Bower (Birmingham).
4. Ernest H. Evans (London).
5. Albert Herbert (Leicester).
6. G. Salway Nicol (Birmingham).
7. Charles B. Pearson (Lancaster).
8. H. Raine (London).
9. J. Hervey Rutherford (London).
10. Ramsay Traquair (Edinburgh).
11. J. A. Woore (Derby).

The Council have awarded the Medal and (subject to the condition, among others, that the said candidate devote a tour of not less than eight weeks' duration in some part of the United Kingdom to the study of Mediæval Architecture) a sum of Forty Pounds to Mr. J. Hervey Rutherford, a Medal of Merit and Ten Guineas to Mr. E. H. Bennett, a Medal of Merit and Five Guineas to Mr. Ramsay Traquair, and a Certificate of Honourable Mention to Mr. Albert Herbert.

(iii.) *The Owen Jones Studentship and £100.*

Three applications were received for the Owen Jones Studentship from the following gentlemen :

1. Vivian John Cummings (London).
2. John Stewart (Bridge of Allan, N.B.).
3. Edgar T. A. Wigram (London).

The Council have awarded the Certificate and

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* Hubert C. Corlette [*A.*].

† Frederick Charles Eden.

‡ Arthur Troyte Griffith, B.A. Oxon.

§ J. Humphreys Jones [*A.*], B.A. Lond.

‖ Alexander N. Paterson [*A.*], M.A.

¶ Henry Ernest Kirby [*A.*].

** Heaton Comyn.

†† Edward F. Knight.

‡‡ William Arthur Mellon.

(subject to the conditions, among others, that the said candidate devote a tour of not less than six months' duration to the improvement and cultivation of his knowledge of the application of colour as a means of architectural expression, and furnish the Council with an original design in coloured decoration of a prescribed subject) One Hundred Pounds to Mr. John Stewart.

(iv.) *The Godwin Medal and £40.*

One application was received for the Godwin Bursary from the following gentleman:—

E. W. M. Wonnacott (London).

The Council have awarded the Medal and (subject to the condition, among others, that the said candidate spend not less than five weeks in some part of Europe, other than Great Britain and Ireland, or America for the purpose of studying and reporting on works of Modern Architecture) the sum of Forty Pounds to Mr. E. W. M. Wonnacott.

(v.) *The Tite Certificate and £30.*

Eight Designs for a Royal Mausoleum were submitted under the following mottoes:—

1. "En Avant."
2. "Endeavour."
3. "Imperial."
4. "Memento Mori."
5. "Memoria."
6. "Petronius."
7. "Red Rose."
8. "Rex."

The Council have awarded the Certificate and (subject to the condition, among others, that the said competitor, after an absence of not less than four weeks, shall submit satisfactory evidence of his studies in Italy) a sum of Thirty Pounds to the author of the design bearing the device "Red Rose,"[*] a Medal of Merit and Five Guineas to the author of the design bearing the motto "Petronius,"[†] and a Certificate of Honourable Mention to the author of the design bearing the motto "Memoria."[‡]

Prize for Design and Construction.

The Grissell Medal and £10. 10s.

Four Designs for a Fruit, Flower, and Vegetable Market were submitted under the following mottoes:—

1. "Artichoke."
2. "Jack."
3. "Khartoum."
4. "Simplex."

The Council have awarded the Medal and Ten Guineas to the author of the design bearing the motto "Simplex,"[§] and a Certificate of Honourable Mention to the author of the design bearing the motto "Jack."[‖]

The Ashpitel Prize.

The Board of Examiners (Architecture) having reported that none of the successful candidates in the Final Examinations of 1898 has distinguished himself sufficiently to deserve the Ashpitel Prize, value Ten Guineas, the Council, on the recommendation of the Board, have awarded a Prize of Five Guineas to Mr. Charles Riddey [*A.*] and Mr. John Kirkland respectively.

The Arthur Cates Prizes.

Prizes of Books to the value of Ten Guineas, offered by Mr. Arthur Cates, ex-Chairman of the Board of Examiners, to the Students whose testimonies of study for admission to the Final Examination are considered by the Board to best merit the Prizes, provided they pass the examination for which the said testimonies are submitted, have, on the recommendation of the Board of Examiners (Architecture), been awarded to Mr. Albert Herbert, of Leicester, for the June Examination, and to Mr. H. Inigo Triggs, of London, for the November Examination.

Extra Prize for Testimonies of Study.

An extra prize of Five Guineas has been awarded to Mr. Henry Tanner jun., of London, for his testimonies of study submitted for the November Final Examination.

The Travelling Students' Work in 1898.

Pugin Student.—The Council have approved the work of Mr. Charles de Gruchy, who was elected Pugin Student for 1898, and who travelled for three months in Cornwall.

Tite Prizeman.—The Council have approved the work of Mr. John Stevens Lee, who was awarded the Tite Prize in 1898, and who travelled in Italy.

Aldwinckle Student.—The Council have approved the work of Mr. James B. Fulton, who was awarded the Aldwinckle Studentship in 1898, and who travelled in Spain for a period of not less than eight weeks.

Owen Jones Studentship 1897.—In view of the work at present being executed at Constantinople by Mr. A. E. Henderson, Owen Jones Student of 1897, the Council have decided to grant him a sum of Fifty Pounds out of the Owen Jones Fund, being the value of the Studentship not awarded in 1898.

In witness thereof the Common Seal has been hereunto affixed this Sixteenth day of January 1899, at a Meeting of the Council, G. Aitchison, *President*; Edw. A. Gruning, *Vice-President*; Ed. W. Mountford for *Hon. Secretary*; P. Gordon Smith, John Belcher, J. M. Brydon, *Members of Council*; W. J. Locke, *Secretary.*

The Essay Medal and the Soane Medallion.

In reading the Deed of Award at the Meeting of the 16th inst., the Chairman, Mr. E. W. Gruning, referred to the high standard of general excellence among the seven essays sent in, the winning essay being exceptionally well illustrated. The Council had been pleased to signify their appreciation by awarding a second prize, and bracketing for honourable mention the work of three other competitors.

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[*] James B. Fulton.

[†] Alexander McInnes Gardner.

[‡] Ernest T. Jago.

[§] G. Gardner Wallace.

[‖] Charles A. Daubney.

With regard to the Soane Medallion, the President, at last Monday's meeting, stated that the Council considered that the selected design was by far the best sent in, and that they had thought fit to award it the prize, notwithstanding that the design contravened in certain particulars the regulations of the London Building Act.

Prize Drawings to be exhibited at Allied Centres.

The selection made from the Prize Drawings for the annual exhibition at the Allied Societies throughout the country comprises the drawings indicated below, to the number of twenty-four strainers. These are accompanied by thirty sheets of Testimonies of Study submitted for the past year's Examinations, including those awarded the Arthur Cates and extra Prizes for Testimonies of Study at the June and November Final Examination.

The Royal Institute Silver Medal (*Measured Drawings*).—St. Paul's Cathedral, North Porch (1 strainer), by Mr. H. E. Kirby (under motto "Wren"), awarded the Medal and Ten Guineas.—St. Catharine's College, Cambridge (2 strainers), by Mr. Heaton Comyn, awarded Medal of Merit and Five Guineas. — Southwold Church (1 strainer), by Mr. Edward F. Knight, awarded Medal of Merit and Five Guineas.

The Soane Medallion.—Design for a Concert Hall (2 strainers), by Mr. William Arthur Mellon (under motto "Ben Marcato"), awarded the Medallion and One Hundred Pounds.

The Pugin Studentship.—Drawings and Sketches (3 strainers), by Mr. J. Hervey Rutherford, awarded the Medal and £40.—Drawings and Sketches (2 strainers), by Mr. E. H. Bennett, awarded Medal of Merit and Ten Guineas.—Drawings and Sketches (1 strainer), by Mr. Ramsay Traquair, awarded Medal of Merit and Five Guineas.—Drawings and Sketches (1 strainer), by Mr. Albert Herbert, awarded Honourable Mention.

The Tite Prize.—Design for a Royal Mausoleum (3 strainers), by Mr. James B. Fulton (under motto "Red Rose"), awarded the Certificate and £30.—Design for the same subject (2 strainers), by Mr. Alex. McInnes Gardner (under motto "Petronius"), awarded Medal of Merit and Five Guineas.—Design for the same subject (1 strainer), by Mr. Ernest T. Jago (under motto "Memoria"), awarded Honourable Mention.

The Owen-Jones Studentship.—Colour drawings (3 strainers), by Mr. James Stewart, awarded the Certificate and One Hundred Pounds.

The Grissell Medal.—A Design for a Fruit, Flower, and Vegetable Market (2 strainers), by Mr. G. Gardner Wallace (under motto "Simplex"), awarded the Gold Medal and Ten Guineas.

Final Examination : Testimonies of Study.—4 sheets by Mr. Albert Herbert [*A.*], *Cates Prizeman* June 1898 ; 7 sheets by Mr. H. Inigo Triggs, *Cates Prizeman* Nov. 1898; 7 sheets by Mr. Henry Tanner, jun., Extra Prizeman Nov. 1898.

Intermediate Examination, Testimonies of Study.—5 sheets by Mr. Lionel Upperton Grace ; 5 sheets by Mr. Thomas Frank Green ; and 2 sheets by Mr. Thomas Joseph Byrne.

The drawings go first to the Allied Society at Birmingham, where they will be on view at the exhibition of students' work in connection with the Birmingham School of Art, which opens on the 6th February.

THE ADMINISTRATION OF BUILDING BY-LAWS IN RURAL DISTRICTS.

Discussion at the Institute, 16th January.

Mr. Lacy W. Ridge [*F.*], in accordance with notice, brought forward the following resolutions at the General Meeting of the 16th inst., Mr. Edw. A. Gruning, *Vice-President*, in the Chair.

1. That the administration of Local Building By-laws in rural districts is a matter calling for the action of the Royal Institute.
2. That the Council be requested to communicate with the Local Government Board on the subject, and to appoint a Special Committee to consider and take action thereon.
3. That matters of sanitation, including the preparation of the site for building, should in all cases be carried out under the supervision of the Local Authorities. That where separate tenements adjoin they should be divided by party walls of incombustible material. That the interests of the public in buildings in rural districts are not such as to justify any further interference on the part of the public authorities with the construction of buildings.

Mr. Ridge observed that the subject of building by-laws in rural districts deserved the attention of the Institute. Architects who practised in rural districts must find this to be the case. They were called upon to supply drawings and to submit to regulations with regard to buildings put up in country districts, which added to their duties and to their clients' expenses. At the recent meeting at Birmingham [p. 105] the subject had been discussed, and considerable feeling expressed that something should be done. The matter had also attracted the attention of the public, and letters had appeared in *The Times* on the subject —amongst them, one from their old and valued member Professor Roger Smith. With regard to his second proposition, which naturally followed upon the first, he suggested the Institute's going to the Local Government Board, because the assent of that body was necessary to any building by-laws made by local authorities. Large towns were capable of taking care of themselves, but country places had not the same power of adapting by-laws to their requirements, and depended largely upon the Local Government Board. Accordingly the Local Government Board should be approached by the Institute, with a view to getting them to reconsider the Model By-laws now put forward—first, because since they were framed a new and considerably improved Metropolitan Building Act had come into operation, under which there was greater liberty of building and greater liberty of design than under the old Act; and secondly because these Model By-laws, however applicable they might be to large towns, where people were crowded together, were very inapplicable—indeed, oppressively inapplicable—to country districts. If the Local Government Board could be persuaded to draw up a series of by-laws which would apply to large towns, some which would apply to towns of moderate dimensions, and some which would apply to rural districts only, architects would be relieved of a great deal of unnecessary and unpleasant supervision by officials, often ignorant of building, who considered themselves bound to enforce the by-laws, whether they did any good when carried into execution or not. If the Local Government Board would move in that direction architects would be relieved in many cases from difficulties which were very annoying if they were not very important. Unfortunately, the less important it was that by-laws should be enforced, the less competent was the local authority either to make the by-laws or to enforce them when made, or to know when not to enforce them when inapplicable. Among the powers of making by-laws were those of imposing penalties in case of their infraction, and nothing could be less satisfactory than the present state of things with regard to that matter. As regards any by-law there should be some means of ascertaining, as there was under the London Building Act, what the law is, and what the local authority was entitled to enforce; and disputes should be settled by a properly constituted Court. He proposed that the Institute should appoint a committee to approach the Local Government Board on the matter. It might be thought that it was a subject for the Practice Committee to take up. But he had brought it before that Committee some years ago, and found that there was a stupendous weight of town influence, and that they did not care sufficiently about things in the country to take any action upon it. Ultimately the Practice Committee turned their attention to the London Building Bill, and the Institute scored from that line of action, as London architects had an opportunity of assisting in the formation of the new Act. The same thing should be done with regard to the rural laws. The committee to be appointed should not be composed of men entirely interested in London, of men who, as it were, had drawn in the London Building Act with their mothers' milk, and who conceived that everything written in that Act was of the eternal fitness of things and must be applied everywhere. The committee should consist mainly of men interested in country work, who did not feel that it was necessary for the law to regulate small matters of building in country places. Though originally he wished to see this matter taken in hand, specially with regard to rural districts, if those interested in the Paper and discussion at Birmingham thought that their views also should go before the Local Government Board, it was manifest that they could not have two committees communicating with the Board at once, and a proportion of members interested in the larger question might very properly be put on the committee—that might be left to the Council. His third proposition was an attempt to show the lines on which the regulations might be arranged. The public could have no interest in a man's building in an isolated spot away from his fellow-men, building on his own account and for his own uses—except so far as the general health was concerned. The public had a right to interfere from considerations of health; and it was extremely important in treating drainage that the rivers and streams should not be polluted, or anything done that would be a nuisance to other people. On the subject of health, therefore, by-laws should apply throughout the whole country. None should be exempt. Railway stations, for instance, should be subject to them; their sanitary appliances were generally very defective; how they got rid of their sewage he could not say—but the parish officials should be in a position to know. In country places houses occasionally were built adjoining one another; and where two separate premises adjoined the provision of a party wall between the two was not unreasonable. If they had by-laws suitable to such conditions they would, he thought, apply to the vast majority of country towns which now considered themselves bound to take over by-laws only fitted to and required in crowded towns. Why market towns should bother themselves with by-laws that were perfectly unnecessary he could not imagine—unless it was that they considered it so much more respectable and their officials thought it so much more important to be an urban authority. But they were not urban in the sense of being crowded. The ordinary market town consisted of one long street and a few side streets, and was not at all crowded; nothing was necessary beyond the enactment of the party wall, and that the sanitary conditions should be satisfactory. Why one should be compelled to build always in brick or stone, or why one should be refused the use of such things as weather-tiling, or why timber should not be used in a more sane manner than allowed by the Model By-laws—which seemed to him a very fine model for producing dry-rot—he did not know. The public had no interest in interfering in such things at all—and any interference which was not necessary was against the liberty of the subject, and in itself vicious. He asked the support of the Institute to the two first propositions primarily, and to the third if they should approve of it, as it would then go as a sort of instruction to the committee as to the line of action to be adopted. He did not desire the Institute to be committed absolutely to the third proposition, but he put it forward as a general instruction to the committee.

Mr. **William Woodward** [*A.*] seconded Mr. Ridge's proposals. Judging from the Paper read at Birmingham by Mr. Henman—a very strong Paper indeed; judging from the letters which had appeared in the *Times*—one notably from Mr. Eustace Balfour, in which the writer complained of the supervision of buildings in London, and advocated what Mr. Ridge contended for—viz. elasticity in dealing with these things; and judging also from a Paper recently read by Mr. Weaver before the Surveyors' Institution, it seemed that this question of the supervision of buildings, whether in London or in rural districts, was forcing itself to the front. Those who had to put up with what Mr. Ridge termed unpleasant supervision—those subjected to what he ventured to term, adopting a now historical phrase, a policy of pin-pricks, for matters absolutely trivial in their character, with no bearing whatever upon the substantial character of the building, with no use whatever to the client public, must agree with Mr. Ridge in thinking that those questions should be carefully reconsidered. With regard to the use of different materials, it was obvious that if a building was situated in a thoroughfare adjoining other buildings where there was danger from fire, strict supervision should be exercised; but when those buildings, as in many rural districts, were so isolated that they had no reference whatever to the public, the by-laws of the Local Government Board should be much less stringent. With regard to the suggestion that exemptions should be made on the one ground of health, he thought they might go further: questions not only of lines of frontage in the present, but, looking forward to the increase in the buildings in any particular town, lines of frontage in the future should be considered, and very strictly considered, by the local authorities. Not only, however, in rural districts, but also in London there should be no exemptions from any measure which was brought forward for the benefit of the community. He could not understand why railway stations, or railway companies, or the Inner Temple, or Middle Temple, or the Office of Her Majesty's Works, should be exempted from the provisions of the Building Act. The Building Act should be applied to everybody building in London. Though the matter was not strictly within the purview of Mr. Ridge's proposals, he was of opinion that if anything was done on the question of supervision of buildings, particularly with regard to matters under the London Building Act, those matters should be relegated from the Police Magistrates to a tribunal which at least could understand the subject brought before them. With regard to elasticity in the application of by-laws, those who had to deal with the London County Council on questions arising under the Factories Acts appreciated the advantage derivable from that Act in each case having to be considered with reference to its own particular circumstances. The County Council officials were thus enabled to deal with each case on its merits, and do absolute justice to the occupants and owners of buildings. He trusted the Council would see its way to adopt Mr. Ridge's suggestion and do its best to secure elasticity in the supervision of buildings, not only in London, but in the rural districts. Such action would have his hearty support.

Mr. W. M. **Fawcett**, *Vice-President*, said that from his experience of the Local Government Board he was sure they would meet any committee from the Institute in the most friendly manner. Some years ago, when the by-laws for Cambridge were drawn up, he remembered the courteous way in which his committee were received by the officials of the Local Government Board, and how they yielded to their reasonable objections against the Model By-laws which the Board had sent them. One he remembered particularly. Cambridge was naturally a very crowded town, having many little houses in the narrow streets, and the ordinary Model By-law said that no domestic building might be built without having a considerable courtyard at the back. The natural result would have been that, if anything happened necessitating renewal, a number of houses could never have been rebuilt at all, because they had not the required space behind them, and owners who anticipated what would happen before the buildings fell down would have built the roof first, then the floors below, and the foundations last of all, and so managed to keep up their buildings. The Local Government Board gave way at once to the objections, and agreed to a by-law which met the case, so that if buildings which were hemmed in were pulled down and rebuilt, they might be rebuilt on that site, provided they went no higher than they were before. There were other things in the by-laws which, speaking from further experience, still required considerable amendment, but they were matters for the consideration of a committee of the Institute if one were appointed to confer with the Local Government Board. There is, for instance, no good definition of what a return wall is. Then there is the question of what the topmost story is. The by-law said if it were above thirty feet high it might be built with a nine-inch wall, and if it were on the ground floor it might not, which was rather absurd. Those were matters on which the Local Government Board were quite sure to meet in the most friendly manner any committee the Institute were likely to appoint. He should certainly support a committee being appointed, because further consideration of the subject would lead to the benefit of the public and of the profession.

Mr. Douglass Mathews [*F.*] said that when the Model By-laws were being prepared the matter was referred to a committee of the Institute, who went very carefully through them. They were intended for the purpose of giving the local authority some idea of what was desirable for securing healthy conditions to a district, and also with a view to improved buildings; but now it seemed that those by-laws, instead of being looked upon as models only, were taken as actual by-laws to be applied to all cases, whereas they should be adapted by local bodies to the requirements of their particular neighbourhoods. If care were taken a great deal of the trouble referred to by Mr. Ridge, which they all appreciated and sympathised with, would be prevented. If the Local Government Board could see their way to reconsider the whole matter it would be very desirable. A great deal of attention was given to the subject by the Institute committee he had mentioned, but circumstances had altered since then, and some modification of the by-laws was now called for. It was thought at the time that the medical officers had a great deal too much to do with it at Whitehall, but probably they saw further at the time than architects. As regarded regulations concerning health, none would desire them to be less stringent, but it would certainly be an advantage to the country generally if many of the requirements referred to by Mr. Ridge were very considerably relaxed.

Mr. Owen Fleming [*A.*] said he supported very strongly the first two resolutions. There was a tendency to adopt city regulations in places where they were unsuitable, and reconsideration of the matter by the Institute would result in much good. It was doubtful, however, whether Resolution No 3 was advisable, as it would seem to tie the hands of the committee. It would be better to let the committee have a free hand. Instead of specifying "party wall," for instance, they might choose to say "party structure." It was doubtful too whether the question of through ventilation at the back of houses would be included in "sanitation." He would suggest that Nos. 1 and 2 be passed, and that No. 3 be referred to the committee to consider.

Mr. Edmund Woodthorpe [*F.*] supported Mr. Fleming's view. By-laws made for the protection of people who were unable to protect themselves would not interfere unduly with the ordinary larger class of buildings—except in the matter of sanitation, which was usually well looked after by the people who build larger houses. But in small cottages and similar property in the country serious cases of defective drainage, cess-pools, insufficient water supply, defective ventilation and such like things occurred, which were not so common in London or anywhere near large towns. If a committee were appointed their hands should not be tied, but they should be perfectly free to make any recommendation they thought desirable. He must take exception to what Mr. Ridge had said about the Practice Committee. When that committee was considering the London Building Act, although some of its members may have been teethed on the provisions of Building Acts, many of them had a considerable country practice besides their London practice, and those who had not, he was sure, listened with great respect to those whose practice was mainly in the country. The Practice Committee at the present time was in want of some work, and he should have thought that this matter would have been well considered by that committee.

The Chairman said he felt there was something in Mr. Ridge's objection that the Practice Standing Committee was composed almost entirely of London architects. Any committee that should go into the question of rural by-laws should call in the assistance of country architects. That would be of the greatest benefit.

Mr. Ridge explained that he was referring to a period years before Mr. Woodthorpe came on the Practice Committee.

Mr. E. Guy Dawber [*A.*] said Mr. Ridge's proposal had his very hearty support. This was a case in which the Institute might help very strongly the great bulk of its country members. Country architects suffered much on account of rural by-laws, which in a great many cases were exceedingly vexatious and harassing and unpleasant. Nearly all small districts were getting by-laws now, and appointing urban surveyors; and in most cases their regulations were taken *en bloc* from either the London or Birmingham or other Building Acts, and applied quite irrespective of the buildings they were intended for in the country, and as a rule by men who had little or no knowledge of building—farmers or country tradesmen, or persons of that sort—while the man who was appointed as inspector or district surveyor when they started to build in many cases had been previously the inspector of nuisances. These officials were often very fond of heckling the architect and carrying out the by-laws to the very letter. If the Institute could take action in the matter and appeal to the Local Government Board, they would greatly assist country architects.

Mr. P. GORDON SMITH [*F.*] said he was very glad Mr. Ridge had raised this question, as it was evident from the correspondence in the papers that the subject needed attention. He was quite sure—in fact, he could pretty well promise—that the Local Government Board would receive any representations that might be made to them by the Institute with the utmost consideration. He would not discuss the details of Mr. Ridge's resolutions. The first and second called for no further discussion. The third was inclined to drift into points of detail, and he would fight shy of it, because, looking into it, he found himself involved in certain difficulties. He did not understand, for instance, how far it would be right that, if a party wall of incombustible material were to be required between two attached houses, two detached houses in close contiguity might be built with external walls of weather-boarding. So far as his experience had gone in discussing this question with a great many architects all over the kingdom, he thought there was great want of knowledge of the circumstances under which building by-laws may be made. The Model By-laws were published in 1877—they had been in course of preparation for a few years before that—but they were made under the authority of the Public Health Act 1875, and they gave only to urban authorities the power to make by-laws on certain specified subjects. The Act further gave to rural district councils power to get urban powers where they thought it desirable; that is to say, where the rural district council saw that one part of their district was developing, or likely to develop, into anything like a town, where there were going to be building operations, they could apply at once to the Local Government Board for power to make the same by-laws as if they were an urban district. Under that Act a great many rural district councils had obtained power to make by-laws, and those by-laws remain in force until repealed. In many cases he personally had suggested modifications of the Model By-laws in order to abate the stringency of their requirements; and there were now published a vast number of modified clauses which went a long way to relieve the oppression (if he might call it so) created by the original Model By-laws. As an example, where party walls were required to go up through and above the roof, it had been usual for a great many years to allow in rural districts a by-law requiring the party wall to go up only to the under side of the roof covering. That modification was considered sufficient in the case of small buildings. Numerous other modifications had been allowed from time to time, and these were now published and accessible to everybody, but owing to the repeated complaint of oppression the Legislature (for the Local Government Board was acting only under legislative powers) passed the Public Health Acts Amendment Act 1890, which extended the power of making by-laws from what it was under the Act of 1875, so as to give rural district councils the power to make by-laws of their own accord, without any application to the Local Government Board beyond what was required of all by-laws, viz. for confirmation on two or three different points, such as foundations and walls of buildings, for purposes of health, and a few other health clauses. This went a long way to meet Mr. Ridge's complaint. Rural district councils could now make by-laws without any difficulty whatever, so far as foundations and walls and matters of drainage were concerned.

Mr. RIDGE remarked that if those authorities stopped there he would not mind; but they brought in things which were not required, and some limitation should be put on their powers.

Mr. GORDON SMITH, continuing, said they were already limited. Rural district councils could not make by-laws with regard to the walls of buildings, for example, for the prevention of fires, or for securing stability, unless they got special powers. It had been said that rural district councils were not competent to make by-laws. But the Legislature thought otherwise; therefore, rightly or wrongly, they could do so. He himself was not prepared to admit that they were incompetent. Then the complaint was made that they had power to enter a building and pull down what was in contravention of the by-laws. Was that any serious hardship? If the by-laws had to be carried out, power must be given to have them enforced both as regarded entering and pulling down what was in contravention of them, and as to the enforcement of penalties. The same with regard to penalties for continuing offences; there must be penalty clauses; the by-laws would be unworkable without them. Then, again, the question of compliance or non-compliance with the requirements of the by-laws had to be settled by some competent Court, and the Legislature had laid it down that the competent Court—for better or worse, whatever it was worth—was in the first instance the police court or the bench of magistrates. If parties were not satisfied with their decisions they must go to the higher Courts. Then if they were prepared to accept the control of the building operations so far as they were allowed to be regulated—if they were prepared to accept the control of the district councils as regarded health matters, why could they not be trusted with the control of the other two matters they had or might have to deal with? It must be borne in mind that by-laws, in order to be of any use in a growing district, must be made before the district grew much. He had known districts where the by-laws had been delayed in order that the speculating builders on the district council might get their buildings up before the by-laws were passed. He did not in the least oppose Mr. Ridge's suggestion that a committee should be appointed to go into the whole matter. He would rather go further than a committee of the Institute and agitate for a much higher committee to go into the question of the administration of the controlling laws relating to building all over the country, to see how they work and how they could be amended and improved with advantage. But if the subject were fully considered by the Institute, and the Council decided to make any representations to the Local Government Board on the matter, he could assure them that those representations would be considered with the most careful attention.

Mr. Ridge said he did not quite follow Mr. Gordon Smith with regard to the penalties. He had not realised whether they could take things before magistrates in the country in the same easy way as they could before a magistrate in London in case of disagreement with the district surveyor. [Mr. Gordon Smith replied that it was just the same in the country; parties could go before a bench of magistrates.] Mr. Ridge, continuing, said that as a matter of fact the real evil arose from the desire of very small places to believe themselves to be towns, and more particularly to believe themselves to be growing and important towns. Places with 1,500 inhabitants found they had built some twenty houses in a year, and thought that they were growing at such a pace that they must have the powers of Manchester or Liverpool; and then three miles away from the town people were subject to these Metropolitan by-laws—often they knew nothing about it until their buildings were three-quarters up. As far as the discussion had gone every one seemed willing to accept Resolutions Nos. 1 and 2. The third proposition he did not insist on; but it would be useful as an indication of the line the committee should take.

After some further discussion on a proposal to adopt part of the third resolution, Mr. Douglass Mathews urged that if Nos. 1 and 2 were carried it would be sufficient to refer the third proposition to the committee, who should take this and all other matters into consideration.

Mr. H. Heathcote Statham [*F.*] thought this was the best course. They would be all the more unanimous, and probably do more good by supporting Nos. 1 and 2, and, if Mr. Ridge were willing, letting No. 3 drop.

Mr. Ridge having agreed to withdraw his third resolution, Nos. 1 and 2 were thereupon put from the chair and carried unanimously.

Mr. Henman's Paper [p. 105].

Mr. A. H. Worsley [*A.*] writes, under date 17th January:—

I understood that London members of the R.I.B.A. were to have an opportunity of speaking on Mr. Henman's Paper at last night's meeting, but as the whole discussion was confined to Mr. Ridge's motion, I should like the opportunity of recording my views in the form of a letter. I think it is most unfortunate that Mr. Henman should have thought it desirable to refer to a matter reflecting on the character of Building Inspectors, which indirectly reflects upon architects (for many have been trained as architects), and even members of our own Institute and I venture to hope that these gentlemen will bestir themselves in order to clear their character of what may be regarded as a direct stain on their honesty, whether in their fair supervision or otherwise. I quite agree that Building Inspectors are, in most instances, underpaid for the thankless task they have to perform, and if Mr. Henman has had unpleasant experiences, there seems to be no reason why he should tar them all with one brush, nor do I see what good the introduction of such matter will do in furthering the object he has in view. I have had occasion to meet many Building Inspectors, but have never found anything but fair play and honesty, and I am inclined to think that architects are sometimes in error in not making themselves acquainted with local by-laws when preparing their plans. If by-laws are in force, and are ignored in one case and not another, how is the Building Inspector to draw the line, seeing that he is not allowed any discretionary power?

Cav. Boni's Researches at the Roman Forum.

The President sends for publication the following extracts from a letter he has recently received from the Cav. Giacomo Boni [*Hon. Corr. M.*]:—

"The Ministry of Public Instruction having accepted my proposal to complete the excavations and rearrange the architectural remains of the Forum Romanum, I was put in charge of the works last September, with the following results:—

(1) The discovery and rearrangement of unknown blocks, carved or moulded, of the Arch of Fabius, of the Basilica Æmilia, of the Arch of Tiberius, Basilica Julia, &c.

(2) The discovery of the secret room of the Temple of Vesta.

(3) The discovery of the base of the *ara* raised on the spot where Cæsar's corpse was cremated.

(4) The discovery of the tomb of Romulus, the *niger lapis* of Festus, in the Comitium. (See the Scholiasts of Horace, *Ep.* xvi. 13, who quote Varro.)

Having got hold of the prolongation of the Sacra Via, which I have already dug in the direction from the Regia to the Arx, I shall proceed with the excavation of the Clivus Viæ Sacræ to the

Summa Sacra Via, having gathered proofs to demonstrate that originally it went straight to meet the axis of the Colosseum, and that Hadrian removed the Arch of Titus to its present situation when he built the Temple of Venus and Rome.

At the same time my investigations will turn round the Rostra and the so-called Græcostasis in order to determine also the extent of the Volcanal and the site of the Arch of Tiberius. I am strengthening the angle of the Temple of Saturn in order to be able to explore and discover the cellæ of the Ærarium.

During my investigations in the Forum I study the character of each architectural detail, with some interesting results—enough to prove, for instance, that the Temple of Castor and Pollux, and that of Mars Ultor, are not specimens of arch work of the age of Tiberius or of Augustus, but are both the work of Hadrian. . . .

My proposal to demolish the modern pavement which cuts in two the Temple of Romulus (the son of Maxentius) has been approved, and I propose to collect in that interesting round building of the fourth century the casts of ancient bas-reliefs showing the buildings of the Forum in their original condition, together with a series of old drawings and engravings illustrating the history of the excavations since the fifteenth century."

Mr. Penrose's Portrait.

At the request of Mr. J. S. Sargent, R.A., the Council have sanctioned the removal of the portrait of Mr. Penrose (*Past President*) from the Institute to Boston, U.S.A., to form part of an exhibition of the artist's works which is to be held early next month in that city. It has been heavily insured against accident, and will be away for two months. A negative of the portrait has been taken by Mr. Fred. Hollyer, the photographer, of Pembroke Square. Members who may desire to purchase photographs are requested to communicate with the Secretary.

The Royal Institute of Architects of Ireland.

Mr. Thomas Drew [*F.*], President of the allied body in Dublin, desires to announce that Central Rooms having been established for the Royal Institute of Architects of Ireland at 20, Lincoln Place, Dublin, they are at the disposal, for address or occasional use, of any member of an Allied Society visiting Dublin, on application either to himself or to Mr. William Mitchell, who has offices adjoining.

Erratum.—An error requires correction in the description of the trusses illustrated on pp. 122–23 (Major Scott Moncrieff's "Experiments on full-sized Timber Trusses"): in each case for 32-*inch* span read 32-*foot* span.

MINUTES. V.

At the Fifth General Meeting (Business and Ordinary) of the Session, held Monday, 16th January 1899, Mr. Edw. A. Gruning, *Vice-President*, in the Chair, with 17 Fellows (including 8 Members of the Council), 18 Associates, and several visitors, the Minutes of the Meeting held 19th December 1898 [p. 104] were taken as read and signed as correct.

The following candidates for membership were elected by show of hands :—

As Fellows.

GEORGE HORNBLOWER [*A. Qualified* 1888].
HENRY HOYNE FOX [*A. Qualified* 1887].

As Associate.

JOHN ALFRED JONES, Jun. (*Qualified* 1888).

The Secretary called attention to a list of recent donations to the Library [see *Supplement*], and a vote of thanks to the various donors was ordered to be entered upon the Minutes.

The Chairman having read the Deed of Award of the Prizes and Studentships 1899, made by the Council under the Common Seal [p. 159], the sealed envelopes bearing the mottoes of the successful competitors were opened, and their names and addresses found to be as follows :—

THE ROYAL INSTITUTE SILVER MEDAL (Essays).
"*Spectrum.*"—Hubert C. Corlette [*A.*], 18, Selwood Place, Onslow Gardens, S.W. (Silver Medal and Twenty-five Guineas).
"*C'est une fée qui prodigue le bien ou le mal.*"—Frederick Charles Eden, 3, Staple Inn, Holborn, W.C. (Prize of Books value £5).
"*Aucassin.*"—Arthur Troyte Griffith, B.A. Oxon., The Priory Gateway, Great Malvern, Worcestershire (Certificate of Honourable Mention).
"*Gloire de Dijon.*"—J. Humphreys Jones [*A.*], B.A. Lond., 94, Dalston Lane, N.E. (Certificate of Honourable Mention).
"*Non quo sed quo modo.*"—Alexander N. Paterson [*A.*], M.A., 136, Wellington Street, Glasgow (Certificate of Honourable Mention).

THE ROYAL INSTITUTE SILVER MEDAL (Measured Drawings)
"*Wren.*"—Henry Ernest Kirby [*A.*], St. James's Palace, S.W. (Silver Medal and Ten Guineas).
"*Non vi sed sæpe.*"—Heaton Comyn, c/o R. Shekleton Balfour, Esq., 76, Inverness Terrace, W. (Medal of Merit and Five Guineas).
"*Nox.*"—Edward F. Knight, North Bank, Oakleigh Park, N. (Medal of Merit and Five Guineas).

THE SOANE MEDALLION.
"*Ben Marcato.*"—William Arthur Mellon, 136, George Street, Edinburgh (Medallion and, under conditions of Continental travel, £100).

THE TITE PRIZE.
"*Red Rose.*"—James B. Fulton, 34, Mecklenburgh Square, W.C. (Certificate and, under conditions of travel in Italy, £30.)
"*Petronius.*"—Alex. McInnes Gardner, 3, Albion Street, Dowanhill, Glasgow (Medal of Merit and Five Guineas).
"*Memoria.*"—Ernest T. Jago, 16, Garfield Road, Lavender Hill, S.W. (Certificate of Honourable Mention.)

THE GRISSELL MEDAL.
"*Simplex.*"—G. Gardner Wallace, 18, Mommery Road, Upper Holloway, N. (Gold Medal and Ten Guineas.)
"*Jack.*"—Charles A. Daubney, 1, Wellington Road, Peckham, S.E. (Certificate of Honourable Mention.)

Mr. Lacy W. Ridge [*F.*], in accordance with notice, brought forward a series of resolutions concerning the administration of local building by-laws in rural districts—urging in Nos. 1 and 2 that the subject called for the action of the Institute, and that the Council should communicate with the Local Government Board, and appoint a Committee of the Institute to consider the matter; and in No. 3 indicating the direction in which modification of present by-laws was desirable, and suggesting some limitation of the power of interference by local authorities in matters of building construction. The resolutions having been seconded by Mr. Wm. Woodward [*A.*], a discussion ensued, at the conclusion of which Mr. Ridge, in deference to the feeling of the Meeting, withdrew his third resolution, it being understood that it should go as a general instruction to any committee appointed. Whereupon it was

> Resolved, *nem. con.*, that the administration of Local Building By-laws in rural districts is a matter calling for the action of the Royal Institute; and that the Council be requested to communicate with the Local Government Board on the subject, and to appoint a Special Committee to consider and take action thereon.

The proceedings then closed, and the Meeting separated at 9.20 p.m.

MINUTES. VI.

At the Sixth General Meeting (Ordinary) of the Session, held Monday, 23rd January 1899, at 8 p.m., Professor Aitchison, R.A., *President*, in the chair, with 27 Fellows (including 15 members of the Council), 30 Associates, 2 Hon. Associates, and several visitors, the Minutes of the Meeting held 16th January were taken as read and signed as correct.

The following Associates, attending for the first time since their election, were formally admitted and signed the Register, viz.:—James Alfred Ernest Lofthouse and Thomas Ashton Lofthouse (both of Middlesbrough).

The President called attention to two portfolios of sketches and several framed drawings, the work of the late Professor Hayter Lewis, which had been lent for the occasion by Mrs. Harvie, daughter of the deceased, and to a number of works on architecture, forming part of the library of Professor Lewis, which had been presented to the Institute Library by his executors [see *Supplement*]: whereupon, on the motion of the President, a vote of thanks to Mrs. Harvie and the executors was carried by acclamation.

The President delivered an Address to Students, [p. 137]; Mr. Beresford Pite [*F.*] reviewed the Designs and Drawings submitted for the Prizes and Studentships [p. 141]; and Mr. H. Heathcote Statham [*F.*], with reference to the subject set for the Soane Medallion, made some observations on the Planning of Concert Halls [p. 145].

The President presented the year's Prizes and introduced the Travelling Students in accordance with the Deed of Award [p. 159], viz.:—

ROYAL INSTITUTE SILVER MEDAL AND TWENTY-FIVE GUINEAS (Essays): to Mr. Hubert C. Corlette [*A.*] for Essay on "The Use and Value of Colour in Architecture," under motto "Spectrum."

A Prize of Books value £5 to Mr. Frederick Charles Eden for Essay under motto "C'est une fée qui prodigue le bien ou le mal."

A Certificate of Honourable Mention to Mr. Arthur Troyte Griffith, B.A., Oxon., for Essay under motto "Aucassin."

A Certificate of Honourable Mention to Mr. J. Humphreys Jones [*A.*], B.A. Lond., for Essay under motto "Gloire de Dijon."

A Certificate of Honourable Mention to Mr. Alexander N. Paterson [*A.*], M.A., for Essay under motto "Non quo sed quo modo."

ROYAL INSTITUTE SILVER MEDAL AND TEN GUINEAS (Drawings): to Mr. Henry Ernest Kirby [*A.*] for his Drawings of St. Paul's Cathedral, under motto "Wren."

A Medal of Merit and Five Guineas to Mr. Heaton Comyn for his Drawings of St. Catharine's College, Cambridge, under motto "Non vi sed sæpe."

A Medal of Merit and Five Guineas to Mr. Edward F. Knight for his drawings of Southwold Church, under motto "Nox."

SOANE MEDALLION and, under conditions of foreign travel, ONE HUNDRED POUNDS: to Mr. William Arthur Mellon, for his Design for a Concert Hall, under motto "Ben Marcato."

PUGIN STUDENTSHIP (MEDAL and, subject to conditions of travel, FORTY POUNDS): to Mr. J. Hervey Rutherford.

A Medal of Merit and Ten Guineas to Mr. E. H. Bennett.

A Medal of Merit and Five Guineas to Mr. Ramsay Traquair.

A Certificate of Honourable Mention to Mr. Albert Herbert [*A.*].

OWEN JONES STUDENTSHIP and, under conditions of travel, ONE HUNDRED POUNDS: to Mr. John Stewart.

GODWIN BURSARY (MEDAL and FORTY POUNDS, subject to conditions of travel): to Mr. E. W. M. Wonnacott [*A.*].

TITE PRIZE (CERTIFICATE and, subject to conditions of travel, THIRTY POUNDS): to Mr. James B. Fulton for his Design for a Royal Mausoleum, under device "Red Rose."

A Medal of Merit and Five Guineas to Mr. Alex. McInnes Gardner for his Design under motto "Petronius."

A Certificate of Honourable Mention to Mr. Ernest T. Jago for his Design under motto "Memoria."

GRISSELL GOLD MEDAL AND TEN GUINEAS: to Mr. G. Gardner Wallace for his Design for a Fruit, Flower, and Vegetable Market, under motto "Simplex."

A Certificate of Honourable Mention to Mr. Charles A. Daubney for his Design under motto "Jack."

The President then made the following presentation of Prizes in connection with the Institute Examinations:—

ARTHUR CATES PRIZES FOR TESTIMONIES OF STUDY submitted for the Final Examinations held in June and November 1898: Books value Ten Guineas to Mr. Albert Herbert [*A.*], and a like Prize to Mr. H. Inigo Triggs.

Extra Prize for TESTIMONIES OF STUDY: Cheque for Five Guineas to Mr. H. Tanner, jun.

Extra Prizes to Students who have taken first place in the Final Examination: A Cheque for Five Guineas to Mr. Charles Riddey [*A.*], and a like Prize to Mr. John Kirkland.

The following presentations were made to last year's Travelling Students:—

PUGIN STUDENTSHIP 1898.—Medal and Cheque for £40 to Mr. C. De Gruchy.

ALDWINCKLE STUDENTSHIP 1898.—Cheque for £25, being second moiety of the total sum, £50, for travel, to Mr. James B. Fulton.

The proceedings were then brought to a close, and the Meeting separated at 9.40 p.m.

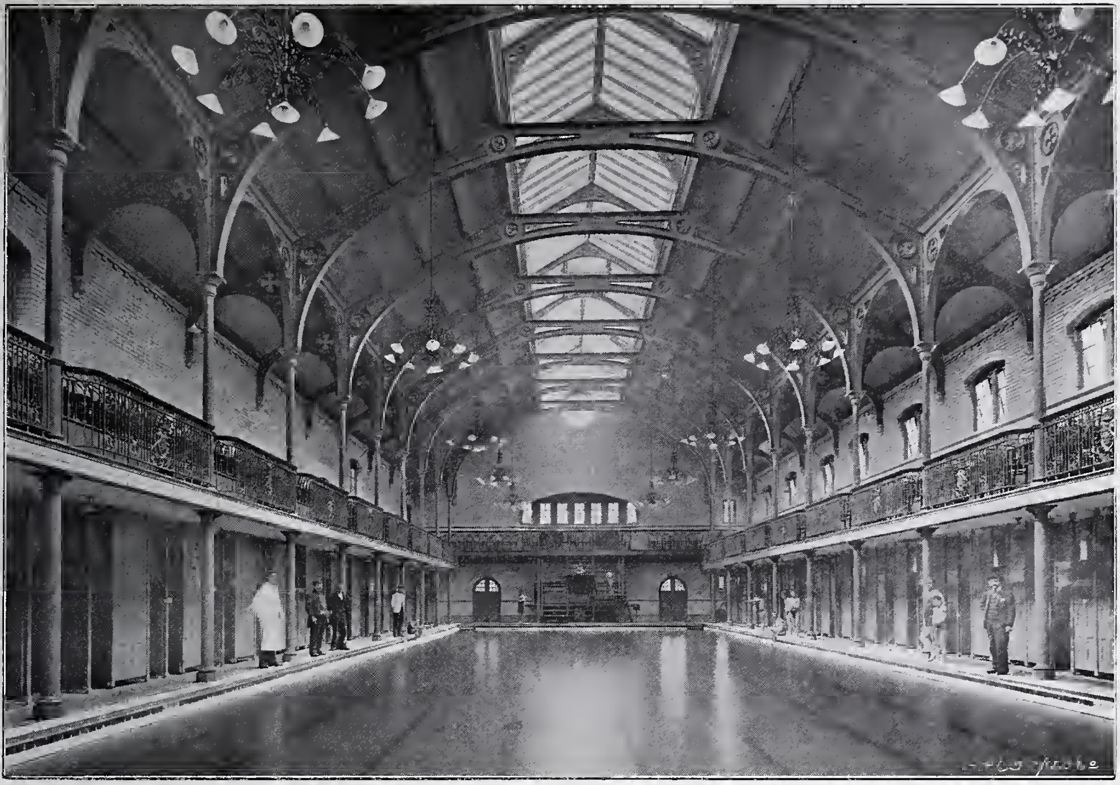

FIG. 1.—MEN'S FIRST-CLASS SWIMMING BATH, KENNINGTON ROAD BATHS.

PUBLIC BATHS AND WASHHOUSES.

By A. Hessell Tiltman [*F.*].

Read before the Royal Institute of British Architects, Monday, 6th February 1899.

IN response to an invitation from the Council of the Institute, I have undertaken the pleasurable duty this evening of reading a Paper upon Public Baths and Washhouses. There are two ways of honouring such an invitation: one, and by far the easier, is to describe the plan and construction in some detail of these establishments as we most frequently see them; the other is to define the principles which I think should govern their arrangement, especially under the very different conditions which now surround this problem, as distinguished from those under which the "Baths and Washhouses Act" and some of its earlier supplementary Acts were passed. To do the first would, I think, be paying my professional brethren a bad compliment, and would also indicate on my part the reverse of that frankness which should be the first consideration of the reader of such a Paper.

I think you will prefer rather to listen, with such attention as they may appear to deserve, to my personal views upon the ordinances which should govern the arrangement of Baths and Washhouses in the future, and their influence upon the arrangement and details of their various departments. My many years' experience in the planning, erection, and administration of these establishments will, I trust, be some excuse for my temerity in submitting the following observations.

The "Baths and Washhouses Act" was passed in 1846, in order, in its own words, "to encourage the establishment of Public Baths and Washhouses." Under the provisions of this and its amending Acts a very large number of these establishments have been erected in London and the provinces. From the inception of the first of these Acts up to the present time the Baths and Washhouses movement, as it is called, has made great and constantly increasing progress, until now it threatens to become almost unmanageable. Yet, in spite of this fact, it cannot be contended that the municipal duty of providing facilities for the cleansing of the bodies and linen of the poor is adequately performed. If the statistics of attendances are properly analysed, it will be found that but a small proportion of the class for which these establishments were chiefly intended avail themselves of the opportunities offered. The reasons to my mind for this partial failure in the administration of the Acts are—first, that the initial distribution and classification of the establishments are very frequently at fault; and, secondly, that sufficient effort is not made to educate the masses as to the necessity and benefits of the bathing habit.

I have endeavoured for some years past to draw attention, both in and out of the public press, to the necessity for some changes in this respect; and I am in hope to-night that one result of the reading of this Paper and its discussion may be the endorsement by members of the Institute of some of the suggestions which I propose offering for their consideration. Most able and sincere as have been the efforts made by the various Public Baths Authorities, yet they make almost invariably one and the same mistake. In promoting these establishments they very seldom consider the proper adaptation of the "Baths and Washhouses Acts" to the needs of the various sections of the *whole town or district* before commencing any of their building operations. There is a disposition, too often, to deal with the problem in a piecemeal fashion, and generally to follow the examples of neighbouring parishes or districts, with the result that they constantly repeat the old faults, introducing sometimes new ones of their own.

With the large amount of ground to cover in the short time at my disposal, I do not propose to dilate upon the necessity or advantage of the bathing habit, both to rich and poor alike, nor to its beneficial effect upon the health of the community generally; neither is it my intention to describe the historical features of ancient and modern baths. As regards the ancient Roman Baths, you can do nothing better than read the learned description of our esteemed President, given in his lectures to the students of the Royal Academy in 1889.* Of the development of our modern English institutions of baths and washhouses there are interesting records in the writings of Messrs. Whichcord, Metcalfe, Baly, Turner, and others; besides which there is an extensive amount of literature upon the bathing habits and establishments of other European countries, all of which are well worth perusal.

The primary duty which devolves under the Acts upon our various Bath and Washhouse Authorities is that of providing adequate facilities for the cleansing of the bodies and linen of the poor, and that, too, in such manner and form as not only to meet the requirements of those who have cleanly habits, but more particularly to educate and encourage those who have not been so trained. In the use made of our present establishments this duty I have already stated is but partially performed, owing chiefly to their initial faulty distribution. Practically the bathing community to be catered for may be divided into three classes—viz. the middle class, the working class, and the very poor; and it is the association of all these in large proportions, for all purposes of swimming, bathing, and washing, in almost every establishment, that I consider is the great initial blunder. The result of this over-centralisation of all departments is practically that the legitimate requirements of not one of them are properly met; and nearly every department of the establishments so arranged suffers from this mode of treatment, which is the reverse of economical to the ratepayers at large.

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* See also "The Roman Thermæ," by Professor Aitchison, TRANSACTIONS, N.S., Vol. II. p. 105.

What I think is required to correct the faults complained of is the practical adoption of some system of Central and Branch Establishments, classified and distributed to suit the special needs of each district. The visitors to our swimming and the best of the ablutionary baths may very reasonably be expected to go any distance within a mile or so for their bath, whereas those using the public washhouse are seldom found to come from within a greater distance than a quarter of a mile, and never beyond half a mile. The cleansing baths, especially those for the very poor, should be within an equally convenient distance. This being so, it would appear as if the ablutionary baths and the public washhouses should be decentralised and located at much more frequent intervals throughout those districts requiring them, forming really a series of Branch Establishments; whilst the swimming baths, providing larger and even better accommodation than at present obtains, should constitute Centralised Establishments at one or more points, equally dividing up the whole district.

The Central Establishment thus suggested would be the chief and most attractive of the establishments of the district. Its accommodation would consist of four swimming baths, and possibly a small teaching pond, to be used alternately by either sex of bathers; and with these might be associated a number of slipper baths, and a suitably arranged installation of hot-air baths. It would also accommodate the head offices of the general district administration, as well as the towel laundry for the cleaning of the towels, drawers, &c., of this and all the smaller establishments. Its site would naturally call for some prominence in one of the chief thoroughfares, and all extraneous advertisement of the Central and Branch Establishments might very well be concentrated upon it.

I have divided the Branch Establishments into one of two given types, which I shall call for convenience "A" and "B." The buildings, accommodating establishments of either type, differ in almost every particular from the central one. In the first place, they are much smaller in size, and are very compactly arranged, requiring sites of small area and of no special prominence. They should be placed at such frequent intervals as not to exceed a distance of half a mile of any bather or washer throughout the poor and populous districts.

Branch Establishment, Type "A" (Baths and Washhouses).—This would consist of buildings accommodating from 30 to 50 slipper and douche baths, and a public washhouse of from 30 to 50 washing compartments. Its business would be carried on at very similar rates, as in corresponding departments of our present establishments. Generally speaking, the public washhouse (and possibly some of the women's slipper baths) would occupy the ground floor, and the men's slipper baths the first floor.

Branch Establishment, Type "B" (People's Baths).—These would consist of small buildings arranged in a very similar manner to the Continental type of people's baths. The accommodation would consist almost entirely of the warm and cold douche or shower bath (from twenty to thirty in number) of the so-called Lassar type now being so largely adopted throughout Germany, Austria, and the United States.

The Branch Establishments of either type could readily be put upon the site of from two to four *small* houses of many of our bye-streets. Such sites would, comparatively speaking, be neither costly nor difficult of acquisition. Many of you will know what a very costly, dilatory, and troublesome proceeding it is to secure sites for our present establishments.

It will be seen, I hope, that with establishments of varying scale, and of three different principles of arrangements as here suggested, the wants and means of all classes of visitors to our rearranged bathing and washing institutions are properly provided for; and, as in the Branch Establishments, the buildings are placed within very short distances of the homes of the working and poorer classes; and are, moreover, small in size, and would, I feel confident, be found economical in working. Our present large and ornate establishments, placed at great distances apart, and in very prominent positions, do not by any means sufficiently attract the very poor bather, who more often than not fights shy of being seen to enter them.

Many of our Metropolitan parishes and provincial towns have one, two, or more sets of baths and washhouses that would serve for these Central Establishments. I respectfully suggest to the authorities that before extending their provision of these admirable institutions any further they should consider the advisability of doing so in the direction of the Branch rather than the Central Establishments.

It is sometimes said that the administration and maintenance of these smaller buildings would be proportionately more expensive than those on a larger scale; but I am confident that the reverse of this would be found to be the case. Within the last four years I have visited very many of the baths and washhouses of the United Kingdom, France, and Belgium, and in the autumn of last year I visited and inspected no fewer than fifty-six of the public baths, of various arrangements and sizes, of Germany, Austria, and Hungary. In Germany I found very much to admire in the arrangement and administration generally of these institutions by the State; and I came to the conclusion, as the result of my trip, that whilst in many of the excellent features of our own establishments we need fear no competition, German or otherwise, yet the true spirit and intention of the "Baths and Washhouses Acts" would be much better carried out by adopting some of the practices of this country than by an obstinate perseverance in our present somewhat blundering system.

The United States of America have recently awakened to the great importance of this question to their own country; and a committee of medical and other experts, called "The Mayor's Committee for Public Baths of New York," recently, after careful investigation, rendered a most exhaustive report upon the system employed in the public bathing establishments in the various European countries. Their views, as stated in a report of great length, are not entirely favourable to our pretensions in this matter; and, in the result, their general preference is for the arrangement and administration of the new form of German and Austrian people's baths. They specially commended the new "Rain Douche Bath" as almost universally practised in these countries. One of the resolutions of their report is to the following effect: "That the spray or rain system of baths be adopted because, primarily, there is no waste of water; in the second place, the cost of erection is very moderate; and lastly, it is characterised by cleanliness and simplicity." The bath referred to is simply a gentle shower of water, the temperature and force of which are easily regulated by the bather, the water at once running off into the open drain under footboard. On the walls are copies of the plans of one of the new public baths now being erected in New York in accordance with the recommendation of the report.

The distinguishing features of the German and Austrian baths may be briefly summed up as follows:—

Open-air river baths are very largely adopted, some of them being upon a very large scale. On the walls will be found drawings of a very good example of one at Hamburg. The general establishments, especially the most recent ones, are much smaller than our own, and are placed at much more frequent intervals. A small proportion of these only have swimming baths attached, and in these cases the ponds are fewer in number and smaller in size. No bather, be he rich or poor, is permitted to enter a swimming pond until he has carefully washed himself, from head to foot, under the warm douches, and, if necessary, used the foot-bath. The dressing-boxes are almost invariably arranged upon what I call the "back-corridor" system; an arrangement, however, that to my mind possesses no single advantage, whilst it adds unnecessarily to the size of the swimming hall, and moreover for any large attendance of bathers it is very difficult of supervision. These dressing-boxes are placed upon both the lower and the upper floors (when there is a gallery); and there is an abundance of open dressing places provided for school children in addition. Altogether this dressing-space accommodation in proportion to the superficial area of pond surface is much greater than in our own swimming baths. The ponds are neither by size, shapes, nor fittings suitably arranged for swimming contests, which I was told usually took place in the much larger ponds in the river baths.

The lighting generally is not so good as that of our own, but the warming and ventilation are far in advance; and the same may be said of the general and mechanical engineering work of the establishments. These ponds are kept open all the year round; but this is rendered easy by their small size, and the general excellence of the warming arrangements both in and out of the water.

It was stated very recently in one of the leading daily papers that the water in the ponds of the German baths was invariably cleaner than that in our own. This does not agree at all with what I saw. Owing to the ponds not being lined with white glazed bricks or tiles, but more especially to the difference in the practice of filling them, the water is not so clean in appearance, and is therefore very much less attractive than the beautiful pellucid water of many of our London bath ponds. A very curious effect, different from anything I have seen or known, is to be found in the swimming ponds of the beautiful new public baths at Frankfort. The inside of these is lined throughout with tiles of a bright cobalt-blue tint, from the top water-line downwards. This gives to the pond the appearance of a large vat of liquid starch; and the effect was by no means pleasant to my mind. I was told the reason of the adoption of such an expedient was that the colour of the water when turbid should not be perceptible; a reason that in England would, I venture to say, have secured the immediate rejection of such a tricky treatment of the pond lining.

In many of the establishments there are installations of hot-air baths of the kind commonly called with us "Turkish Baths," but in these countries denominated "Roman-Irish Baths." These hot-air baths were usually supplemented by a Russian (or vapour) bathroom, opening out of the same cooling and douche rooms as the former. In Germany the process of these baths is very similar to those of this country, but in Austria and Hungary the shampooing is omitted (unless specially asked and paid for), a second plunge of intermediate temperature being substituted for it.

The public washhouse as we know it scarcely exists anywhere out of England. In Germany all I could hear of or see were four rather old establishments at Hamburg, Berlin, Augsburg, and Metz.

The general warm water bath of these countries has been, until very recently, that of the ordinary tub or slipper form. These are made of copper, enamelled iron, polished concrete, white tiles, and marble; but very seldom of the glazed earthenware now so largely in use with us. These baths vary in size and shape; and stand above the floor, or are wholly or partially let into it. In every one of these slipper compartments there is almost invariably a warm and cold douche apparatus.

In Berlin, Vienna, and many of the other principal cities and towns of Germany and Austria the use of these slipper baths, in the reorganised public baths, is being largely discontinued in favour of the "rain douche bath," a form of shower bath introduced to notice and strongly advocated, in preference to the former, by Dr. Oscar Lassar, a well-known skin doctor of Berlin, whose writings upon this question of baths for the poor are not so well known in this country as they should be. Dr. Lassar claims for the "rain douche" that, apart from its lower cost and economy of space, it possesses the following general advantages for the bather himself. Its physiological influence upon the organism is a quickening and refreshing one; at every season it is pleasant and never weakening to spray the well-soaped body with warm water and then to finish off with moderately cool or even cold water. The cleansing is absolutely thorough, and is essentially promoted by the fact that all the dust and dirt with which the water becomes soiled is immediately carried away and continuously replaced by clean water. In the case of the ordinary tub or slipper bath, the bather always finishes up finally in dirty water, more especially the workman, who leaves all the accretions of an entire week in the tub. Moreover, the individual using a public shower bath is better guarded from infection, and from contact with the vestiges of his predecessor than in the tub, as he can himself, without trouble, secure the cleansing of his cubicle by turning the shower nozzle over it. In addition to this, the bath itself calls for but little time or personal service from the attendant in charge, and permits of a greater number of persons bathing quickly one after another without insanitary results. The continuous use of the slipper bath by a large number of bathers rapidly following each other entails much labour and some difficulty to keep clean, requiring the attention of the attendant between each bather's visit. With the "rain bath" little or no attendance is required, whilst the whole principle of the bath is cleaner and less liable to transfer skin complaints than in any other form of bath. It must also be remembered that it presents far less danger of catching cold in comparison with the warm slipper bath, with its relaxing influence upon the vessels of the skin; and that the hardening effect of the bath can scarcely be obtained in a more rational way than through the successive warm and cold ablutions.

These arguments for this new form of bath have been obtained from Lassar's books, and from the officials of bathing establishments in which they are in use: and it must, I think, be admitted that a good case is made out as to their general superiority as quick, cheap, and efficient baths for the poor. A thorough inspection of their working convinced me as to the justice of these claims, which are practically endorsed by the New York Committee before referred to.

In Berlin and many other parts of Germany there are now numerous very small establishments fitted up with this apparatus and no other form of bath. They are arranged in a number of cubicles, arranged for the double purpose of dressing and bathing. Each compartment in its back division is provided with a rain-shower apparatus, which by pulling a lever gives unlimited supply of warm and cold water.

Although the same enthusiasm for this rain bath is shown at Vienna and other Austrian centres, the application of its principle to the plan and arrangements generally is altogether different. Here the three operations of undressing and dressing, hot and cold water douches are provided for in three separate apartments, instead of one double one as in the German examples.

Vienna has already erected eleven of these people's baths, and the erection of several more is contemplated. A similar number of these revised establishments have also been erected, or are in course of erection, in Berlin. Of the two systems of administering these people's baths, that of the Austrian is said to allow, under pressure, of a larger attendance of bathers; as the number of dressing spaces may be from 25 to 33 per cent. greater than the number of bathing cells. The separation of the warm from the cold water compartment enables the attendant to see that each bather properly follows his warm ablution with the cold shower; and, lastly, it is said the separate divisions are more readily kept clean. Its disadvantage to my mind is that the separation of departments requires the adoption of bathing dresses by every bather, and there is of course less privacy about the system than in the German.

After careful consideration of the two systems I must say that my preference is for the German, as being more suitable to our habits ; and I am now arranging its introduction into two new establishments

I think this somewhat lengthy *résumé* of the principle and practice of these new shower baths requires no apology from me, as I feel that it will be full of suggestions to those of you who may not have seen them working.

On the walls will be found plans of the different forms of these Continental baths, all of which I have visited and carefully examined. They have been transposed into an English scale for their better comprehension, and reproductions of some of them appear on subsequent pages. For the opportunity of making these copies I am indebted to the different city authorities in whose charge the buildings are. I must also acknowledge the great assistance rendered me by the authorities of the German Embassy in London, and especially by Herr Muthesius, in my German trip referred to above.

Having given the principles which should govern the distribution and arrangement of public baths and washhouses, and having compared our practice in these matters with that of Germany and other countries, I now propose to describe the plan and arrangement of each of the three classes of typical establishments in such detail as may be possible in the time remaining at my disposal.

CENTRAL ESTABLISHMENT.

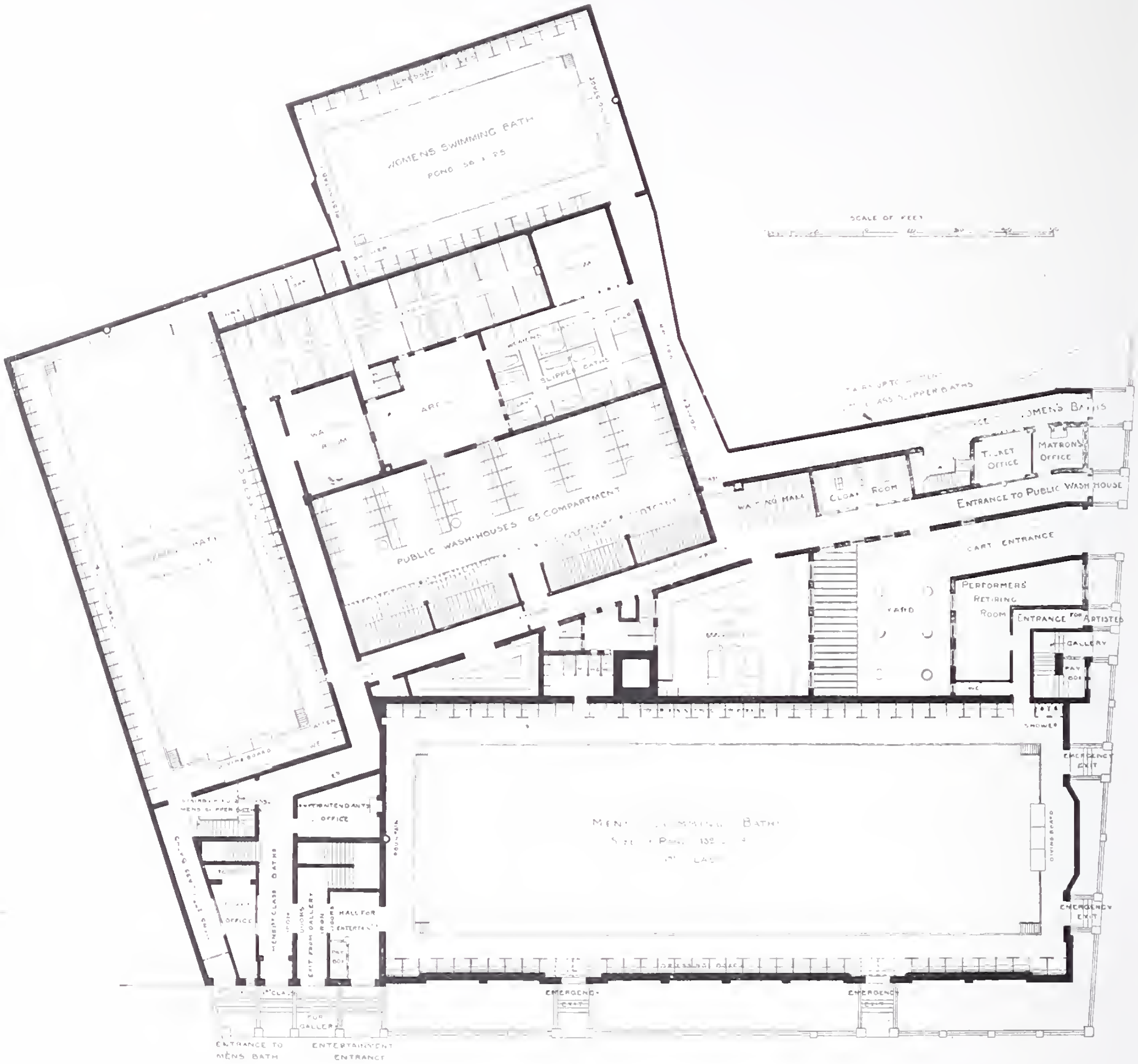
The site for an establishment of this size should have a superficial area of from 30,000 to 40,000 square feet, and, if possible, frontages abutting upon two roads or streets. Its position should be prominent, in a good public thoroughfare, and easily accessible from all parts of the town or parish by omnibus, tram, &c. It should admit of the perfect drainage of all portions of the establishment without necessitating an expensive treatment of levels of the building generally.

The next point of importance is that there should be an abundant supply of water, and that it should be pure and soft. We all know that soft water is appreciated for its great detergent property, and that hard water, apart from its lack of this quality, acts injuriously when used for either washing or bathing ; and, when employed for the generation of steam, forms troublesome and dangerous incrustations in the boilers. For laundry purposes, the use of soft water in lieu of hard effects a very material difference in the cost of soap ; in addition to which, the operation of washing itself is far less disagreeable, and the clothes considerably less subject to wear and tear by it.

The supply at command should be sufficient to meet the largest demands at the busiest period of the season, and should include a storage for some fifteen to twenty thousand gallons of water.

One of the largest items of expenditure in the maintenance of these establishments is that for water. Its importance upon the possible financial results of these undertakings will be appreciated when I tell you that the annual water bill of the Hornsey Road Baths is considerably over £1,200. Two wells have now been bored adjoining the Public Washhouse of the establishment, from which, with the necessary machinery, a supply of some twenty thousand gallons of water per hour will be secured, and which will amply suffice to supply the needs of the buildings which are now in course of considerable enlargement. The cost of the water thus obtained, it is confidently expected, will not exceed from thirty-five to forty per cent. of that from the New River Company's mains. The saving thus effected will convert what has hitherto been a very small deficit into a yearly profit upon the whole undertaking.

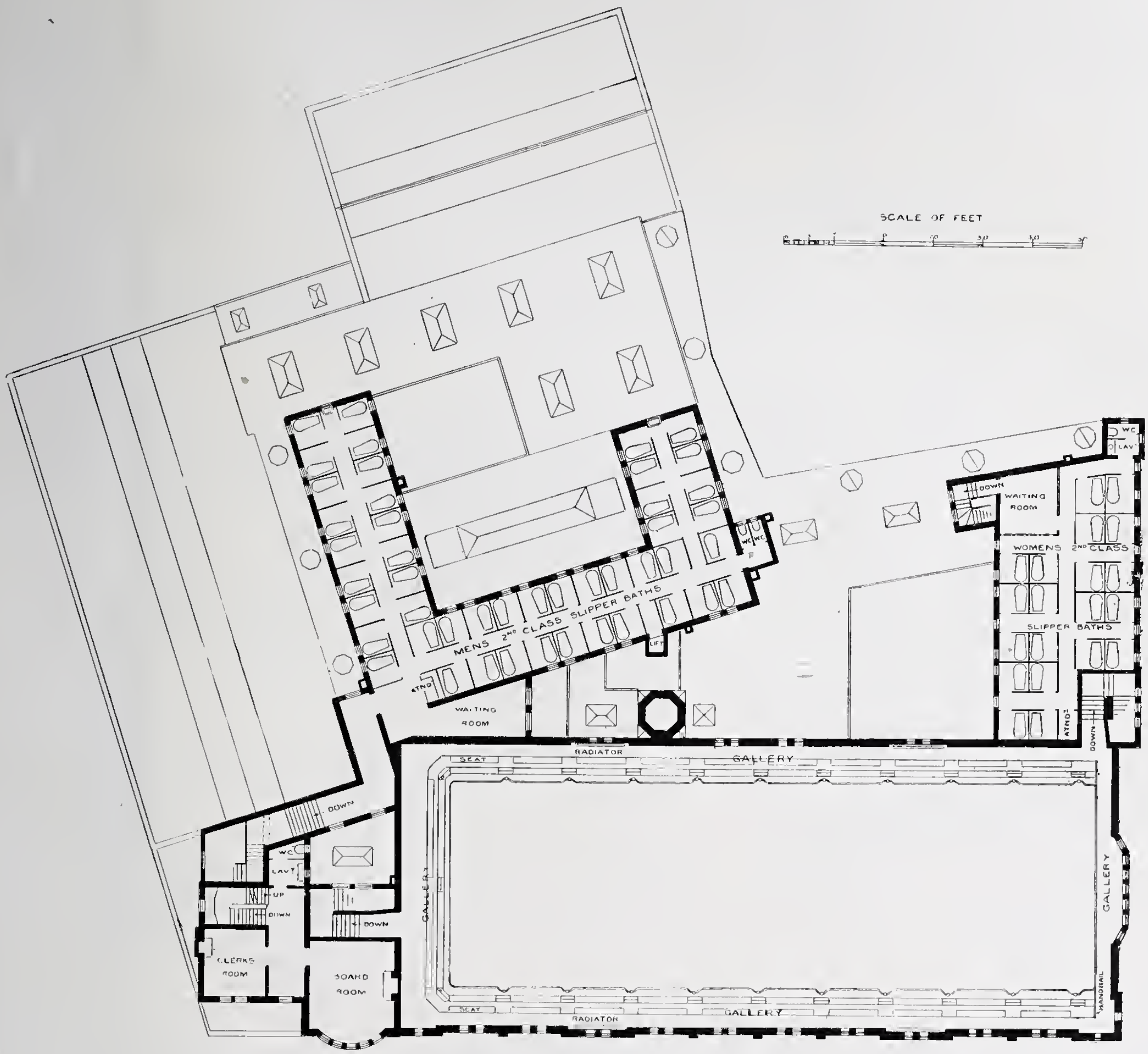
In Glasgow and many of the great Continental cities and towns the municipal authorities make no charge for water used for their public baths. It will not, I hope, be too much to expect that the London County Council, when they have secured the control of the water supply of the Metropolis, will willingly so supply those of our own establishments.



GROUND PLAN

FIG. 2.—PUBLIC BATHS AND WASHHOUSES, KENNINGTON ROAD, S.E. (A. Hessell Tiltman, Architect.)

The difficulty of obtaining sites in positions for these large Central Establishments would be very materially lessened if the promoters would be satisfied with a small frontage towards the main thoroughfare. Subject to this condition, the area of land procurable is practically unlimited, and would carry with it sometimes sufficient frontages to adjoining streets of quite minor importance, but still suitable for an entrance for the delivery of coal, &c. By adapting the quadrangular system to such a site, I enabled the Baths Committee of the Islington Vestry to secure two most excellent sites at a very considerable saving of time and money. The establishments referred to are those in the Hornsey Road, N., and Tibberton Square, N., plans for which are here reproduced [figs. 4, 5, and 6].



FIRST-FLOOR PLAN.

FIG. 3.—PUBLIC BATHS AND WASHHOUSES, KENNINGTON ROAD, S.E. (A. Hessell Tiltman, Architect.)

In both of these instances a very limited amount of frontage was secured, enough for only one main entrance; but through this, by grouping the various departments round a quadrangular space at the back, I secured their necessary six entrances. So far from such an arrangement being objectionable, it has been found so convenient for working purposes as to render it almost a necessity in establishments fronting on very busy main thoroughfares. In my opinion the application of this principle of arrangement to the site of the Shoreditch Baths would have been simply invaluable for quiet and convenient establishment working, and it is to be regretted that the opportunity of adopting it was lost.

As it is proposed to concentrate all the swimming baths of the district in one or more of these Central Establishments, the new treatment of this, the most remunerative of all departments of public baths, will permit of many improvements in their arrangement and fittings not possible under the present system of administration.

I cannot say that the ponds may be larger, for we have already reached in many of our establishments the limit of size beyond which it would certainly be, in my opinion, very unwise to go. It is only parishes like Lambeth or Islington, with sites like those of the Kennington Road and Hornsey Road respectively, that can expect to provide and maintain ponds of the dimensions of 132′ 0″ × 40′ 0″ adequately and without waste. The Vestry of Battersea are, however, I believe, building a swimming bath with a pond larger even than this, *i.e.* 150′ 0″ × 50′ 0″, to be used alternately by men and women. I very much fear such a bath will be unwieldy and extravagant in management. A pond of this size holds just upon 250,000 gallons of water, which alone, at 7½*d.* per 1,000 gallons, will cost £7 13*s.* 9*d.* to fill it each time, and will not in all probability be adequately used two months of its season of six.

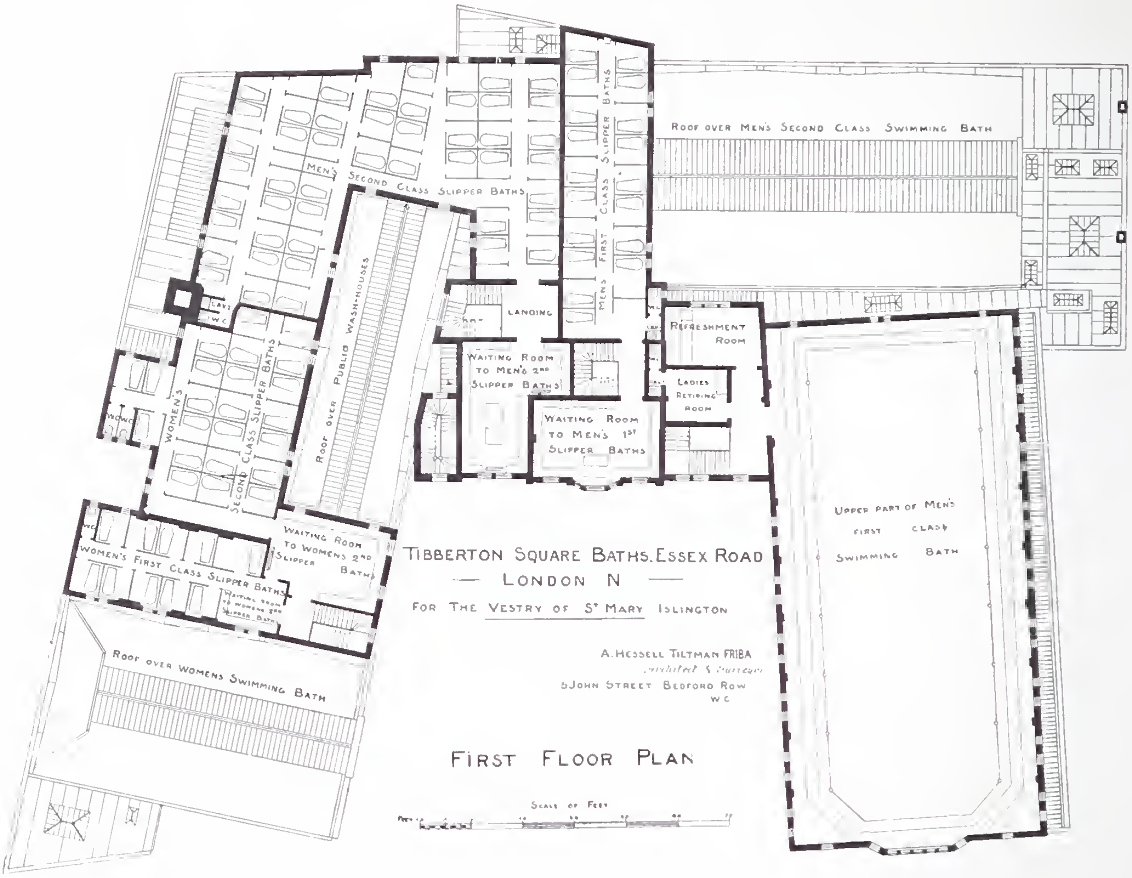

Roof over Men's Second Class Swimming Bath
Men's Second Class Slipper Baths
Men's First Class Slipper Baths
Landing
Lav
W.C.
Refreshment Room
Waiting Room to Men's 2nd Slipper Baths
Waiting Room to Men's 1st Slipper Baths
Ladies Retiring Room
Roof over Public Wash-houses
Women's Second Class Slipper Baths
Waiting Room to Women's 2nd Slipper Bath
Women's First Class Slipper Baths
Waiting Room to Women's 1st Slipper Bath
Upper part of Men's First Class Swimming Bath
Roof over Womens Swimming Bath
Tibberton Square Baths. Essex Road
— London N —
For the Vestry of St Mary Islington
A. Hessell Tiltman FRIBA
Architect & Surveyor
6 John Street Bedford Row
W.C.
First Floor Plan
Scale of Feet

FIG. 5.

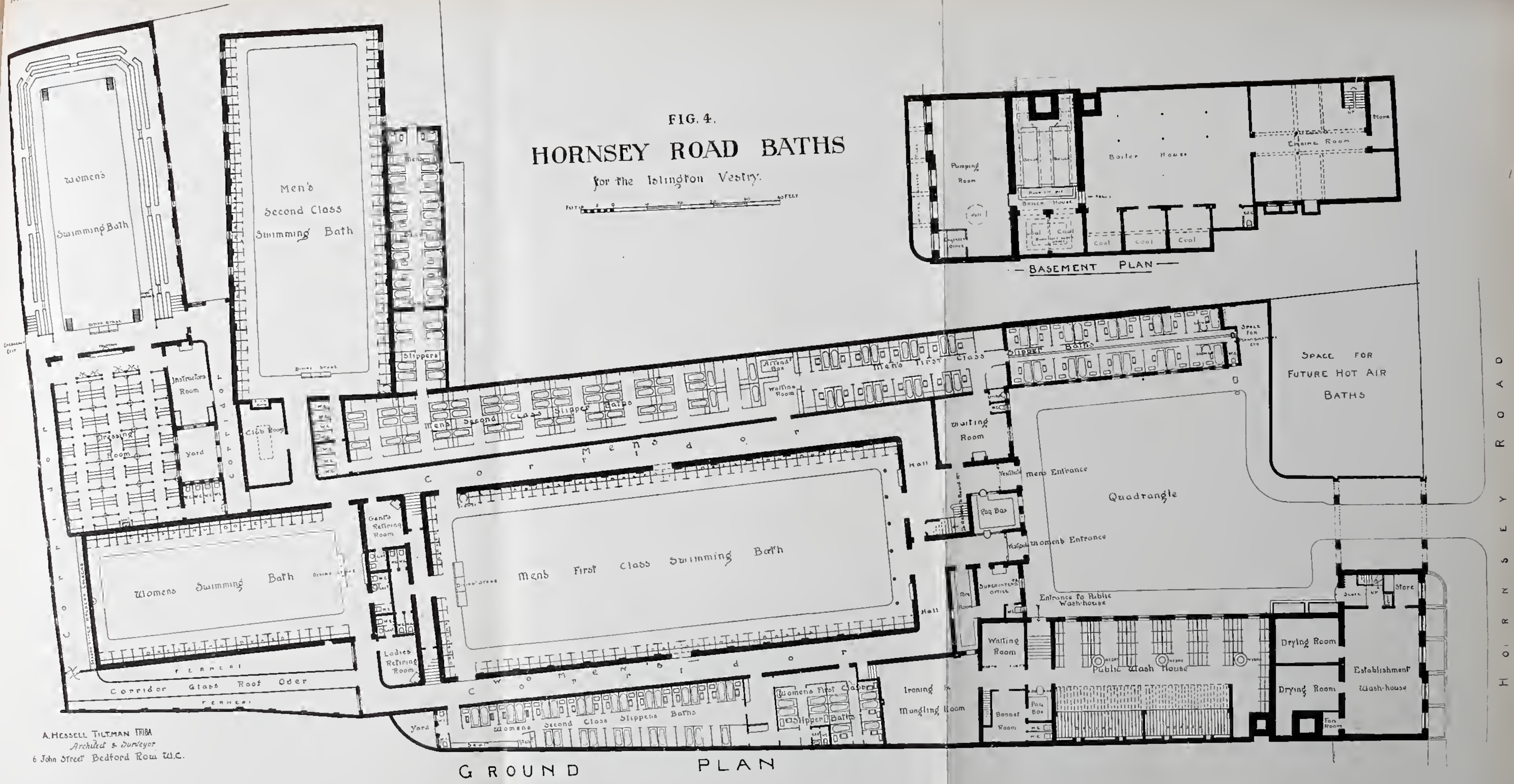
Personally I deprecate the general adoption of ponds of such large size. It is far better, in my judgment, to increase their number in any establishment, rather than their dimensions when the latter exceeds 90′ 0″ × 30′ 0″. By this means only can the consumption of water and the amount of heating, &c., be adapted in any way to the current attendance of bathers.

A very ordinary and useful number of ponds for one of these Central Establishments will

FIG. 4.

HORNSEY ROAD BATHS

for the Islington Vestry.



A. Hessell Tiltman FRIBA
Architect & Surveyor
6 John Street Bedford Row W.C.

be five. These will consist of two baths for each of the two sexes, and a fifth or small pond which may be used alternately from either the male or female corridors for several purposes, but which is principally provided as a teaching pond. This latter provision, although common enough abroad, is almost unknown in England. There are two at the Kent Street Establishment, Birmingham; and I know of no other in this country. The pond to this bath should be about 20′ 0″ × 12′ 0″, and it should be specially arranged and fitted up for the private teaching of swimming. From the convenience of its position and its small size it will doubtless be found useful for small schools, clubs, &c., when not required for teaching, in which case the bridges and other fittings must be removed.

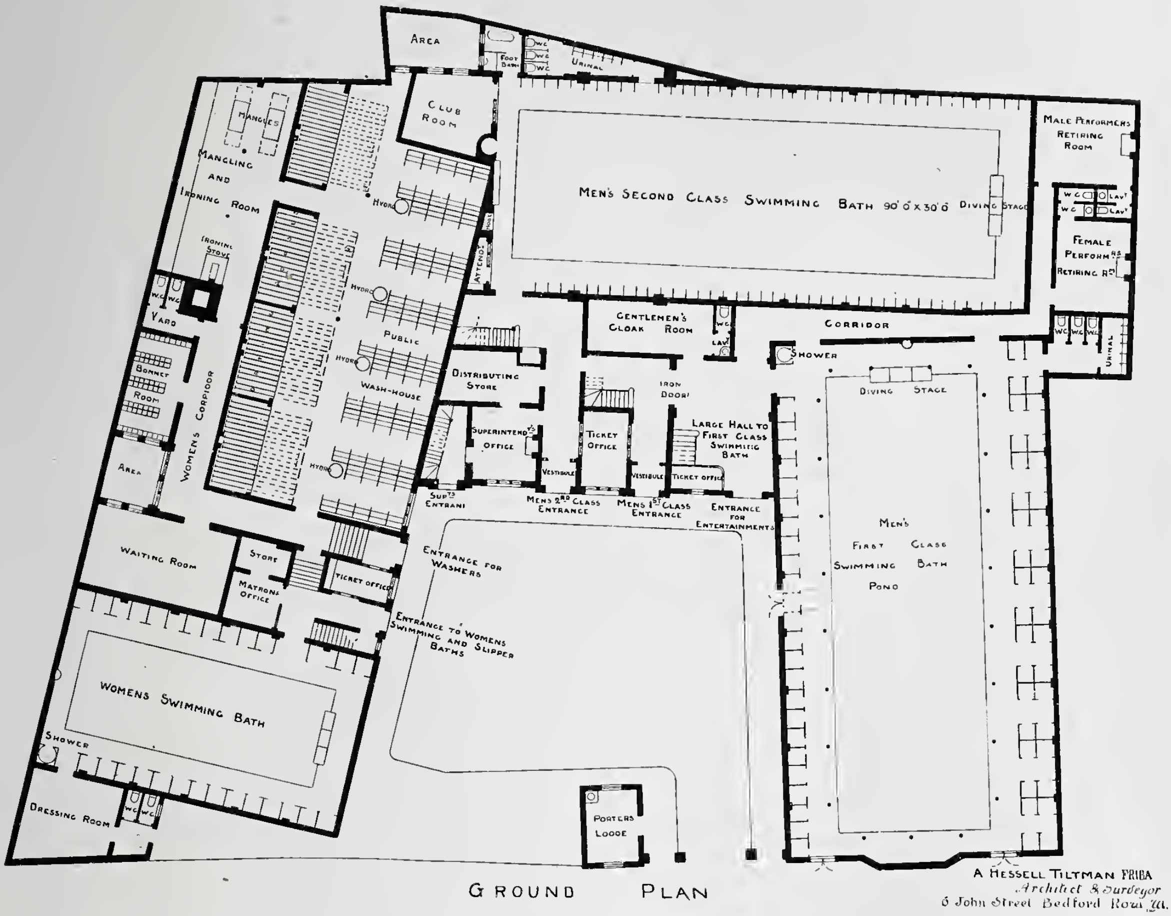


FIG. 6.—TIBBERTON SQUARE BATHS, ESSEX ROAD, N.

The dimensions of the ponds of the other four swimming baths are as follows:—

Men's	first class:	100′ 0″ × 35′ 0″.	Depth,	7′ 0″ to 3′ 6″.
,,	second class:	90′ 0″ × 30′ 0″.	,,	6′ 6″ to 3′ 6″.
Women's	first class:	75′ 0″ × 25′ 0″.	,,	6′ 0″ to 3′ 6″.
,,	second class:	50′ 0″ × 20′ 0″.	,,	6′ 0″ to 3′ 6″.

It is the general practice in England to close the swimming baths during six months of the year, with the exception of the smallest one. I, however, cannot but think this is to be regretted, as the pleasure and benefit of swimming could very well be maintained throughout

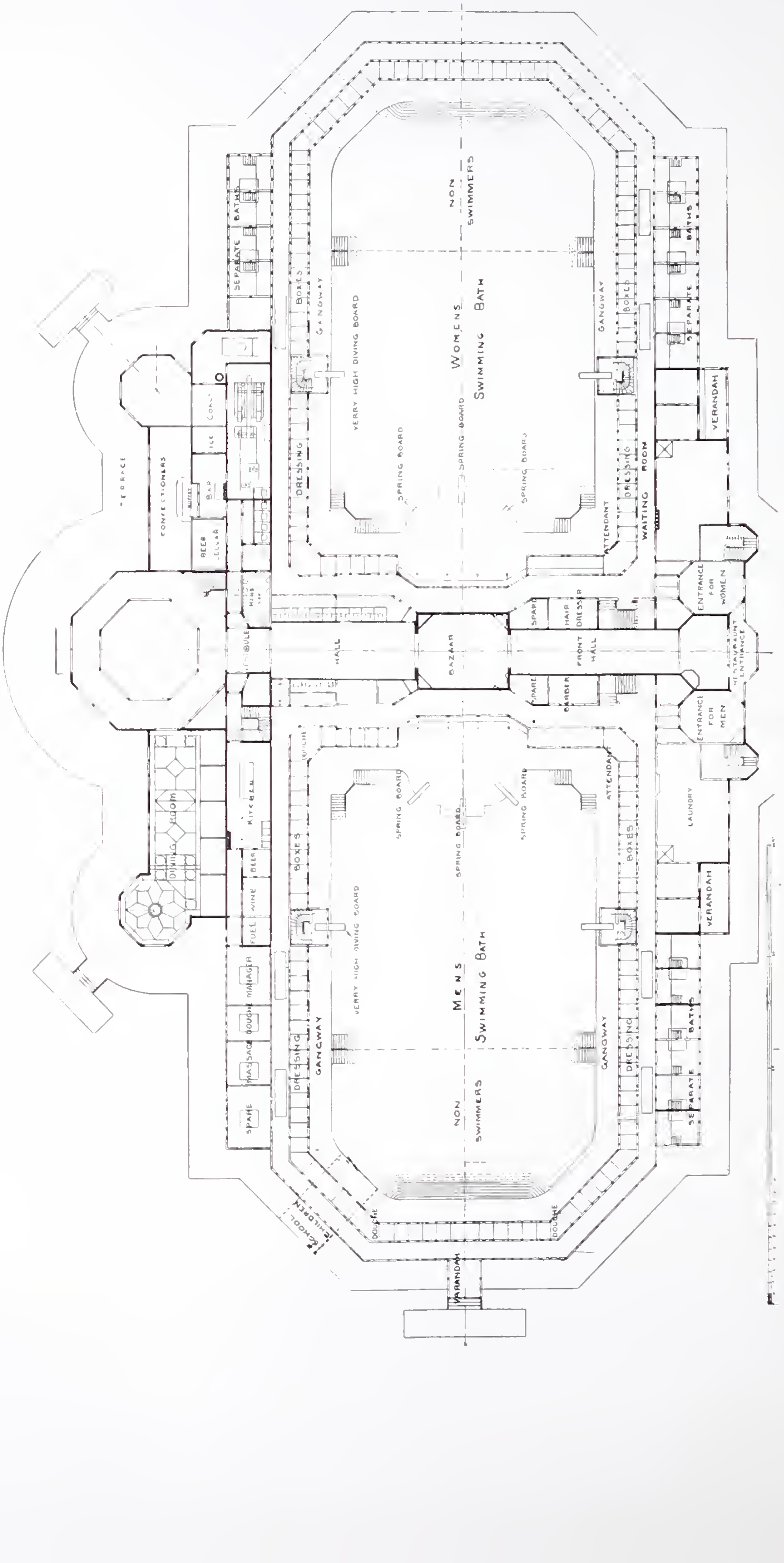
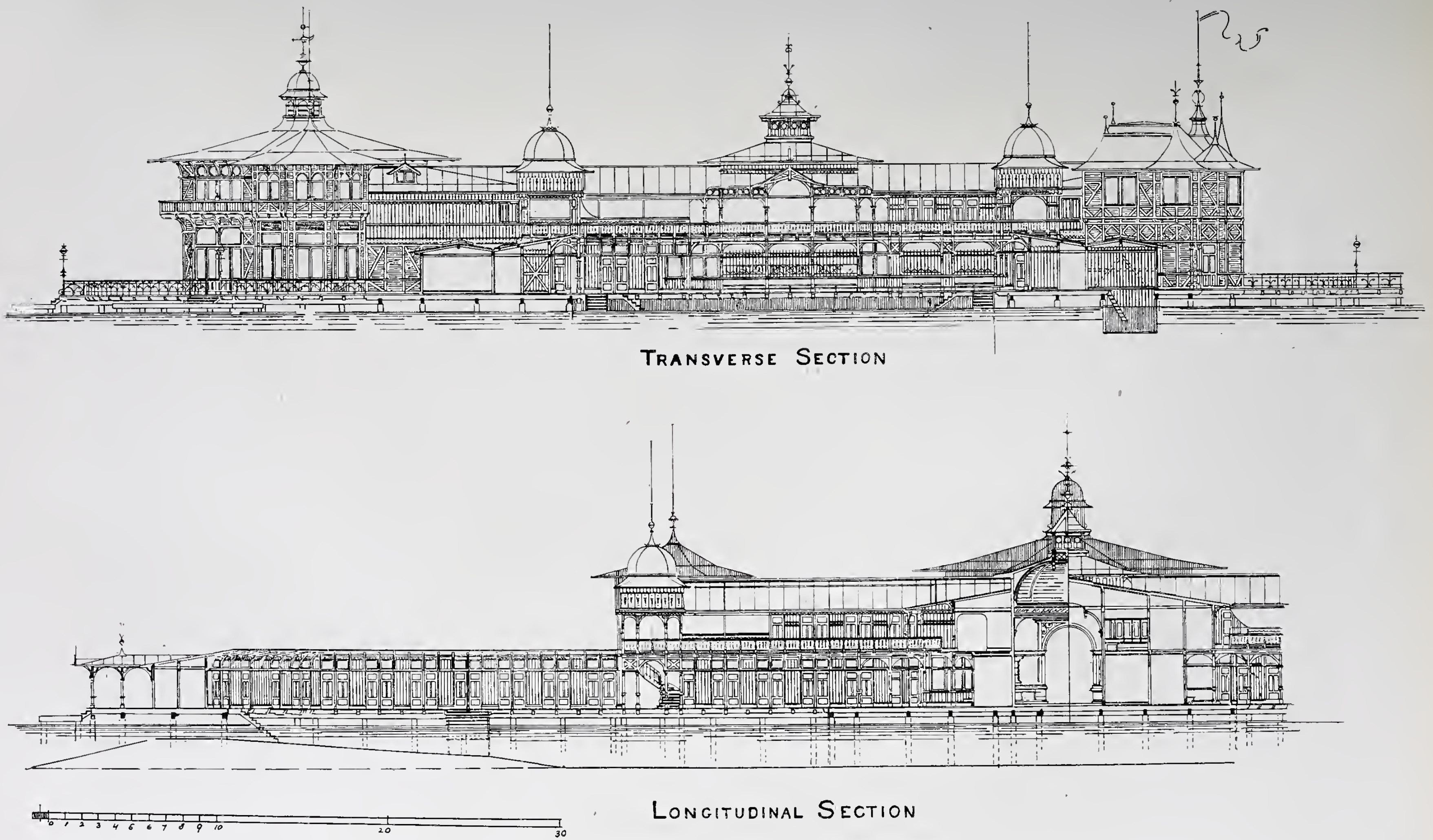


FIG. 7.—RIVER BATHS ON THE ALSTER, HAMBURG. (George Theilen, Architect.)


TRANSVERSE SECTION

LONGITUDINAL SECTION

FIG. 8.—RIVER BATHS ON THE ALSTER, HAMBURG. (George Theilen, Architect.)

the year were we not so wedded to the large-size ponds, and if only the warming and other arrangements were more adequate for their purposes. Germany, with a much colder climate, keeps open its swimming ponds throughout the year; but to do this in this country would necessitate several changes of a structural character, and these being made, the various swimming clubs would gladly use them throughout the winter months.

We must still, I think, presume that one of the series of swimming baths will still, for the present at any rate, be let during the winter months for public entertainment purposes. Whether this be the men's first-class swimming bath (as is usually the case) or any other, it would naturally have the first choice of position upon the site. Should the proposed establishment be in London, the plan in all its details must be very carefully adapted to meet the County Council requirements for public safety before the necessary Music and Dancing Licence can be obtained. The best way to secure this latter is probably to see that two sides of this bath abut on two roads or streets; thus securing the means of ample and direct exits. It must be so arranged, together with its rooms for artistes, cloaks, latrines, &c., that it may be entirely shut off on occasions of such entertainments from the remainder of the establishment.

The now well-understood principles of public safety universally applied to theatres and concert-halls are necessarily and equally applicable to such portions of these bathing establishments as are used for similar purposes. Although these requirements of the London County Council increase somewhat the initial structural cost of the building, still they cannot be said otherwise to be unduly onerous or troublesome. Beyond saying that these requirements deal with the mode of general construction employed, the seating, entrances and exits, the warming and lighting, all as affecting the prevention of fire and panic, I do not propose to deal further with them.

Having thus disposed of the position of our chief department, the remainder of the establishment accommodation has to be arranged in such a manner that all departments may be conveniently attended to at their respective entrances, by not more than two ticket offices. Of these, one of course would be for men, and the other for women; and probably the further each is from the other, the better. After this necessary point of administrative convenience and economy has been attended to, due regard should then be had to the general official communication between all departments, together with their lighting and ventilation.

Although it would undoubtedly simplify and economise the engineering installation, I am not at all sure that there is any objection to placing the purely ablutionary baths upon the first floor. Having regard to the frequently costly nature of these sites, the extra space thereby secured, to say nothing of the advantage to the exterior architectural grouping, I prefer to distribute the baths between the ground and first floors, and, if proper lighting can be obtained, the basement as well. Several of the recently erected Metropolitan establishments have, in my opinion, lost a good proportion of their possible accommodation, and been moreover less conveniently arranged, by the unnecessary persistence in keeping all the slipper-bath accommodation upon one floor.

I have in several of my largest establishments in London placed the greater proportion of the slipper baths upon the first floor, and no inconvenience has resulted therefrom. The arrangement has certainly the advantage of securing more quietude than might be possible in the immediate neighbourhood of a noisy swimming bath. Where slipper baths are so placed, it will of course be understood that they should be for the whole of one or more classes of bathers; and that there must be no subdivision of a single class between two floors. The supply and waste pipes to and from these baths should be carried in small accessible channels in the floor, or with proper precautions they may be suspended from the ceilings immediately underneath and entirely in view. So arranged, they are not necessarily disfiguring in appearance, nor inconvenient in arrangement; whilst the structural subways for their reception between the two storeys, sometimes advocated, would be most extravagant in cost and objectionable in use.

The hot-air baths, in two classes for men and one for women, are probably best accommodated upon the ground floor.

The establishment laundry here I have suggested should be arranged to do its own towel washing and that of all the Branch Establishments, and is most conveniently arranged on the ground floor, or, failing this, in the basement, providing proper access to and from the courtyard is secured.

A thoroughly well lighted and ventilated boiler-house and engine-room should be provided in the basement, with access for the delivery of coal, &c.

The superintendent and engineer and their respective families may have their separate sets of apartments upon convenient points of the second floor.

A refreshment room is a very desirable accompaniment to a bathing establishment, but a very difficult provision to locate satisfactorily.

Having given the primary motives governing the arrangement of this establishment, I will now deal with the details affecting its several departments.

SWIMMING BATHS.

As a very rough rule, it is assumed in Germany that there should be a swimming bath for every 25,000 inhabitants, and that of this number about two per cent. bathe in them daily. As nearly as I can ascertain, the proportion of persons using the swimming baths in England is about 3¼ per cent. It is found that swimmers upon an average bathe once in every four days throughout the season, and that the proportion of male to female bathers is at present 10 to 1. The proportion of the first-class to the second-class men bathers varies from 2 to 1 to about an equal proportion, according to the character of the district.

The foregoing figures must be taken as a very rough approximation to general working data, but they will be doubtless some guide in deciding what the collective accommodation of swimming ponds shall be for a given district, and in proportioning their individual dimensions. What is now very much wanted is a good working unit of pond surface per bather. I have made many inquiries during the last four or five years throughout our own and other countries among swimming masters and bath superintendents, and so far I have obtained no satisfactory answer.

Men's First-class Swimming Bath.—The men's first-class swimming bath is here presumed to be arranged so as to be adaptable for entertainments during the winter. At its chief entrance it has an entrance hall, cloak room for gentlemen and ladies, and at the opposite end the necessary performers' retiring rooms, which are ordinarily in the summer months converted into one large room and used thus as a club and dressing-room by members of swimming clubs using the bath.

The hall usually consists of two storeys—that is, a ground floor with a gallery over. The floor of this latter should be constructed of steel and coke-breeze concrete, and its upper surface should be stepped so that at least three rows of spectators (two seated and one standing) may see the surface of the pond during a swimming contest.

One fault to be found in most of our swimming baths is the insufficiency of the dressing-box accommodation in proportion to the superficial area of pond surface. No consideration appears to be given by architects to this necessary relation between the number of dressing places and the area of the pond; and indeed oftentimes an unnecessary liberality in the dimensions of the boxes adopted has the effect of still further accentuating this blunder. The almost universal arrangement of placing our dressing boxes down two sides, and possibly one end of the hall, must be improved upon if it is desired to correct this defect. There are two ways of doing this: first, the Continental method of placing an equal proportion of the dressing boxes or places upon the gallery floor; and secondly, to arrange them in a series of transeptal bays upon one or both sides of the bath.

I confess to having a strong objection to placing dressing boxes upon the gallery floor, as it entails a direct communication between the two floor levels, which arrangement, at all events, would not be permitted by the County Council under their Music and Dancing Licence. There is also a risk of some accident to young bathers in their running up and down such staircases with wet feet. Examples of this arrangement will be found on reference to the gallery-floor plans of the new baths at Stuttgart and Frankfort, and other of the German baths, of which plans are shown upon the walls.

The second arrangement—viz. the dressing boxes arranged in bays—can hardly be said to have been properly tried anywhere. I have adopted it in a tentative manner in two of my establishments in order to overcome the difficulties of a restricted site, with the result that I recognise it as one way of obviating the difficulty of the scarcity of dressing boxes.

I have already alluded to the "back-corridor" arrangement of dressing boxes in use in Germany and other parts of the Continent. This system was adopted in England with many of the first sets of swimming baths, but, as the arrangement has been practically abandoned everywhere, it is unnecessary for me to say more about it.

The pond should be rectangular in shape, and in the proportion generally of length to width as 3 to 1. Its internal angles should not be rounded, and the whole surface of the water must be free from all permanent projections or obstructions, so that in swimming races every competitor has equal opportunities as to space, &c.; all steps therefore for access to the water should be of wood, and made removable. One or two sets of these are provided at each end, fixed generally to the safety rail or by other equally convenient means. An open self-draining channel, close to the top of the pond and running continuously round it, serves as a scum overflow and spitting trough; and a suitable height above the water line, an iron or copper safety rail 1½ inch in diameter should be run all round the pond for the use of tired swimmers. At the shallow end, a portion of this pipe is usually converted into a spray pipe, extending the whole width of the pond. By raising or depressing the direction of the perforations in this, a very useful and pleasant means of freshening and clearing the top surface of the water may be obtained.

The depth of water usually adopted in this country is 3′ 6″ at the shallow end, sloping down in one line to a depth of 6′ 0″ to 7′ 0″ at the deepest point; and considering the heavy burden the cost of water and its warming is to the authorities, these depths should be considered sufficient for all practical purposes.

The Continental ponds have frequently much greater depth, as, commencing at the shallow end at about 3 feet, and sloping gently to a point at about one-third or a half the length of the pond, the inclination then changes into a much steeper gradient in order to reach a maximum depth of anything from 8′ 0″ to 12′ 0″. When this practice, however, is adopted, a rope has to be stretched transversely across the pond at the junction for the safety of the non-swimmer.

At every foot of difference in the depth of the water throughout the whole length of the pond, there should be indelibly indicated upon the wall just above the safety rail, in plain figures, the depth of the water. Remember that the level of the overflow is not the general level of the water by some two or three inches, and allow accordingly.

The gangways round the pond should be at least 4′ 0″ in the clear width at the sides, and from 6′ 0″ to 8′ 0″ at the ends. The material for the flooring of this gangway is of great importance. I have myself tried, I think, every possible material, including wood; but there is nothing so good to my mind for a paving in this position, and for non-slipping quality, as a well-rubbed, hard, fine-grained York stone. In appearance the colour is not very decorative; but where something better than this is desired, there are one or two good-coloured mosaic pavements which are not slippery, and which may be safely used.

The gangways should have quick self-draining falls towards a form of surface channel that shall not injure the bathers' feet.

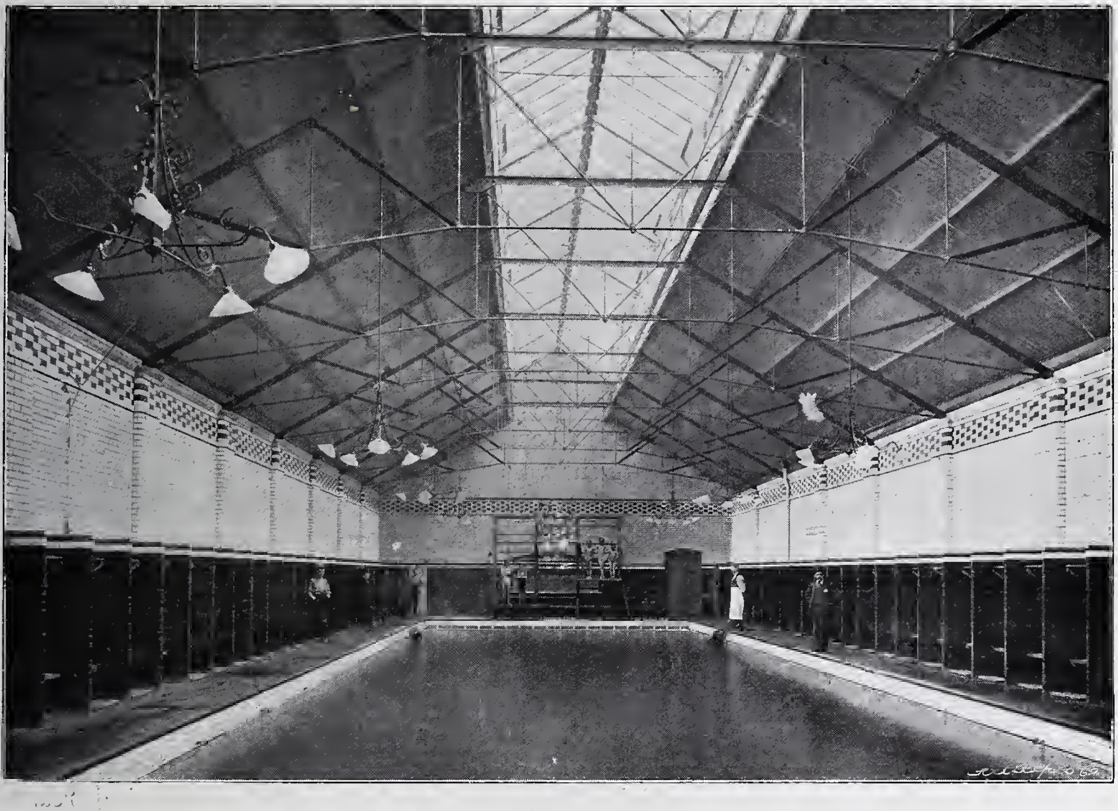


FIG. 9.—MEN'S SECOND-CLASS SWIMMING BATH, KENNINGTON ROAD BATHS.

Some of the Continental ponds have an ornamental railing down the entire length of the two sides close to the edge of the curb, so that no bather can enter the pond except from either the shallow or deep end, and in many instances, either as a part of this railing or independently, there is an arrangement for suspending bathers learning to swim. Both of these ideas are good and might very well be adopted by us.

It is as well to remember, perhaps, that the space required in the pond for water polo is from 75′ 0″ × 35′ 0″, and the depth from 4′ 6″ to 7′ 0″.

The temperature of water in the ponds should be for men from 70° to 72° Fahr., and for women and children 72° to 75°. That of the room outside of the pond, and including the douche room, should never be less than 68°, and for women and children it should equal that of the pond.

If the dressing boxes are to be accommodated in the ordinary manner—that is, down each side of the bath—3′ 6″ × 3′ 6″ is ample room, and any greater size simply increases the difficulty already referred to. In the event of the hall being used for entertainments, these dressing boxes should either be made removable, collapsible, or, what is simpler and preferable, left fixed with the openings over their doors securely closed by suitable shutters.

The fittings required for the boxes are—a seat, footboard, brush and comb shelf, and two coat and hat pegs. In some arrangements, where larger and better lighted boxes can be secured, the addition of a mirror combined with the brush shelf, with a small lock-up drawer under, is to be recommended. There is always a certain amount of theft taking place in the dressing boxes of public swimming baths, and many efforts have been made to stop the practice. Mr. Grahame Plumber, the Superintendent of the Hornsey Road Baths, has lately devised a system of insurance by which, if valuables are left in a certain manner in the ticket office, any loss then occurring is made good by the company covering the insurance. I have seen many devices both in this country and abroad, but none perfectly satisfactory.

An attendant's box should be provided, and adjoining it a room for hanging up and storing in lockers the bathing dress of bathers possessing season tickets.

Among the fittings required for the swimming bath are the diving stage, judges' platform, press gallery, water chute, for all of which you can do nothing better than adopt the patented arrangements of Professor Newman, the superintendent and swimming instructor of the Westminster Baths.

Douche or Cleansing Room.—As you know, this room and its special appliances do not exist in the swimming baths of this country. We have usually, it is true, a cold shower apparatus or two placed among our dressing boxes, but this is very poor comfort as compared with the agreeably warmed apartment which should be provided at one end of the swimming bath, with proper warm and cold douches. I have already mentioned that this is a universal provision of the German baths, as you will see by examining such of the plans of their buildings as I have here. In all these you will observe that this cleansing douche room is treated as a most important auxiliary to the swimming pond. The reason for this prominence is, of course, the necessity for all bathers using its appliances before entering the pond. Every bather in Germany and Austria certainly observes this rule as a matter of most ordinary necessary routine. The argument used for the universal adoption of this practice is that the bather, without any reference to his position in life or his habits, before entering the swimming pond should, out of consideration for his fellow bathers, undergo a thorough cleansing process. I think that both for sanitary and economical reasons it is greatly to be desired that this salutary practice should be adopted in our bathing institutions.

I think there can be very little doubt that the enforced combination of a thorough ablution with the swimming bath would greatly increase the benefit and pleasure derivable from both baths. I regard, therefore, the swimming bath itself, apart from its recreative value, as one of the best means of encouraging the bathing habit amongst the very poor.

I attach so much importance to the introduction of this feature that I am providing this room for several new establishments upon the plans of which I am now engaged.

The general fittings of this room should consist of some six to ten warm, and two to four cold douches; together with a series of four to six porcelain foot-baths.

The club and dressing rooms should adjoin the deep end of the pond, with a wide lounging corridor between them and the bath. The latrines, I need hardly say, should be cut off from the bath as much as possible, and be separately warmed and ventilated.

Should this bath be let for entertainment, it would be necessary to floor over the pond level with the gangways. The only point necessary to remember here is so to construct the trusses supporting this floor, and the flooring itself, as to be readily portable and capable of easy erection and taking down. The framing, &c., to this floor will also require a large amount of dry storing space.

Second-class Swimming Bath.—The difference in the character and class of bathers in this department from those using the first-class bath, calls for certain changes in its fittings. The chief point is that it is very necessary to do away with the wood dressing boxes. In my own practice I substitute for them open boxes, with divisions and backs of slate or glazed bricks, wood only being used in the footboard, seat, and the latticed framed hopper for clothes; all of which should be readily removable. So arranged it is quite practicable to remove temporarily the wood fittings, and clean out with hose and water the whole of the dressing places. Objection is sometimes taken to the absence of doors to these dressing places, and at one of my recently enlarged establishments I was required to provide them out of regard for a supposed sense of decency; but I think those concerned in the management are disposed to doubt their necessity now they have been in use for a season.

Fig. 9, p. 185, is an interior view of the second-class men's swimming baths at Kennington Road, showing open dressing places fitted in this manner.

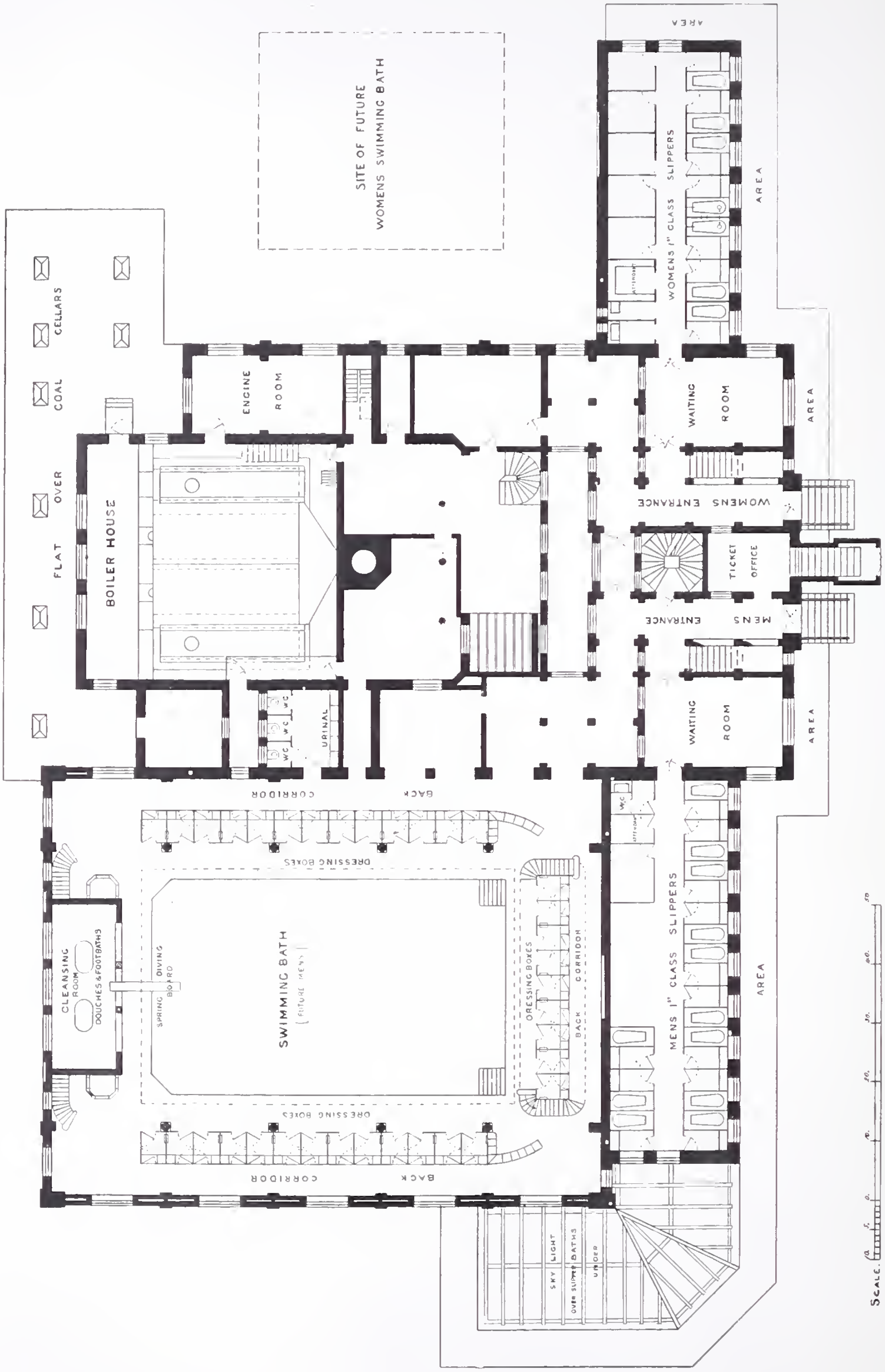
It is not usual to provide a gallery, club or dressing rooms to this bath; but otherwise the appointments are all very much the same as in the first-class bath, less decorative of course, and, if possible, more durable in character.

Ladies' First-class Swimming Bath.—It is desirable here to have dressing boxes of good size, not less than 4′ 0″ × 4′ 0″; and they might very well be provided in a large room separate from the bath. It is desirable to have one or two small rooms adjoining the bath, which may be used either as club or hairdressing rooms. A gallery at one end of the bath is desirable for spectators to watch their children or friends bathing, as it is never desirable to have non-bathing visitors upon the gangways.

Women's Second-class Bath.—The ordinary dressing-box arrangement is here perhaps the best, and with the exception that the club or dressing rooms may be omitted, the arrangements and appointments call for no further description.

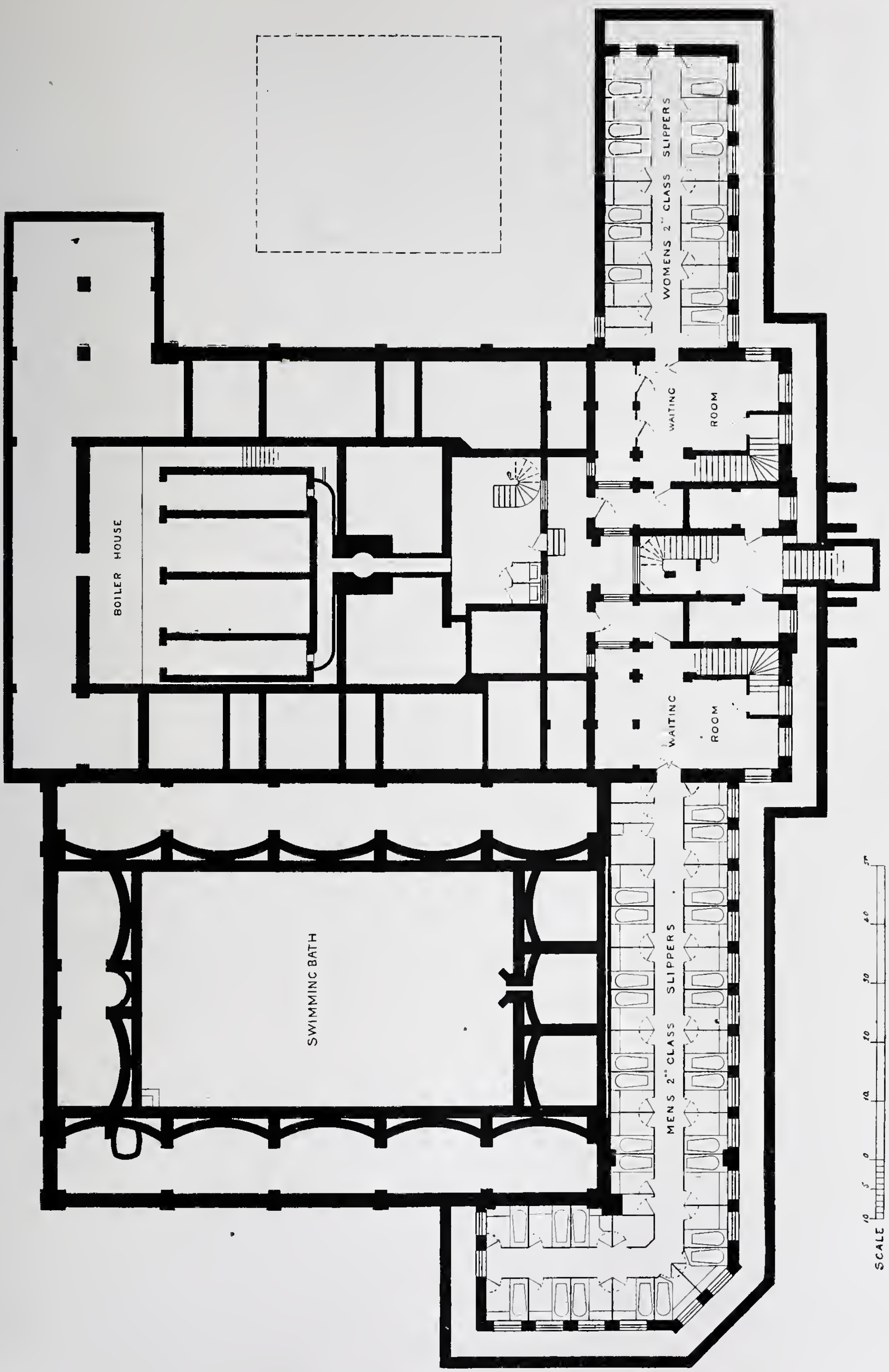
It may be said here that it is very unusual to have two separate baths for the female sex, and so far it has been so. There are signs everywhere that the proportion of women and girls using the swimming pond is daily increasing, partly no doubt due to the encouragement of swimming at the Board Schools. The old practice, therefore, of making the two classes of this sex use the same bath is found so extremely inconvenient that I have had recently to provide the additional swimming bath in several of my establishments.

With the special interest now taken by the School Boards of London and the provinces in the teaching and practice of their scholars in the art of swimming, a very great increase of attendance has occurred at all of our public swimming baths, which threatens partially to dislocate the proper work of the establishment. Whilst no one can welcome more than I do the impetus thus given to the cultivation of the bathing habit, I confess I think that some of the necessary swimming accommodation for this purpose should be provided in some of the school buildings; and I am glad to say that the London and some few of the most important provincial School Boards are providing these baths in some of their schools. Those, however, so far erected that I have seen are in very many of their arrangements and fittings very defective. The warm douche bath preliminary to the use of the pond, advocated in this Paper, is perhaps even more desirable in schools than anywhere else.



GROUND FLOOR PLAN

FIG. 10.—CITY PUBLIC BATHS, HAMBURG.



PLAN OF BASEMENT

FIG. 11.—CITY PUBLIC BATHS, HAMBURG.

SLIPPER AND RAIN DOUCHE BATHS.

These represent the warm and cold water baths of the establishment, and may be accommodated on either ground and first floor or basement.

The First-class Slippers should consist of two compartments, the inner one containing a glazed fireclay bath, white inside and out, the fittings being footboard, towel rail, electric bell and soap dish. The other compartment serves as a small dressing room, and should contain a dressing table and glass, chair, rug, and hat and coat pegs. Each of these baths would have over it a warm and cold douche apparatus. These two-compartment baths are provided in some of the Birmingham establishments, and are very popular.

The Second-class Baths would be fully equal in price and fitting to our present first-class slippers. These consist of a single compartment, the smallest size of which should be 6′ 3″ by 6′ 0″ in the clear. It should contain a glazed fireclay bath as before, but glazed inside and over the roll rim only, the remainder being painted. The additional fittings would be footboard, seat, towel rail, clothes pegs, electric bell, soap dish, combined mirror and brush shelf, and a thermometer.

In both classes the bath should stand free of the wall and floor to permit of ready flushing with water. The divisions may be of enamelled slate, light-coloured marbles, or preferably of white glazed bricks. The height of these divisions should be 6′ 6″, and they should stand some few inches above the floor.

For a small number of baths, the central passage with a row of compartments on each side is best; but where there is a large number it is more economical and better for supervision to arrange them in bays.

The valves to the hot and cold supplies to these baths should be non-concussive, and should be capable of being regulated by the attendant either from the inside or outside of the compartment. The waste should be of such capacity as to permit of the emptying of the bath in two minutes.

Third-class Baths.—To cope properly with the duty of providing the cheapest possible cleansing facilities for the very poor, there is but one way, and that is by the adoption of a warm bath, for which, including soap and the use of towel, a charge of only one penny will be made. I have elsewhere stated that the "Rain Douche Bath" to my mind presents the simplest, cheapest, and, so far as space, water, and time are concerned, the most economical means of effecting this duty. The baths under this class may be entirely douche baths of the type which I have already described.

On one of the drawings upon the wall will be seen the details of a compartment arranged in the Berlin manner.

HOT-AIR BATHS.

These should be provided in my opinion in two classes, the second being, if possible, interchangeable on certain evenings for the use of both men and women.

First-class Bath.—This should be practically both in arrangement and practice upon the lines of the improved form of the Turkish bath now practised in this country. Mr. Metcalfe, a well-known exponent of the Anglicised Turkish bath, speaks of it as "one of pure air, properly heated, having its due proportion of oxygen; making respiration pleasant; oxidation of the blood perfect; evaporation and depuration complete; and exalting the tonic influence of the subsequent cold appliances." There should be three hot rooms—viz. the Tepidarium, temperature 140° Fahr.; the Calidarium, 180°; and the Laconicum, 250°, together with a combined cooling and dressing room, and a shampooing and douche room. In Continental examples, in lieu of the third hot room, it is the common practice to have a Russian bath or vapour room. This bath is not popular in England. It is worked in common with the hot-air rooms from the same cooling, dressing, and shampooing rooms. The combined cooling and dressing room should be a large, light, and airy room divided into bays or divisions 12′ 0″ by 12′ 0″, containing space for four couches. In the Bremen Public Baths there are two sets or classes of cooling and dressing rooms to one set of hot rooms. With the improvement of one of these being divided into compartments, and the other free from them, the arrangement appears worthy of adoption here. The shampooing and douche room has the usual benches, wall basins, douches, sitz bath, &c., and the plunge bath (about 20′ 0″ by 7′ 0″, 3′ 6″ to 4′ 6″ depth) is usually adjacent to it, and *en route* to the cooling room.

Second-class Hot-air Baths.—For these I recommend a system of public baths suggested by Metcalfe in his book, *Sanitas Sanitatum et Omnia Sanitas*, which consists of a combination of hot-air rooms of the Turkish bath, with a system of warmed lavatories in lieu of the shampooing process and plunge bath. It is suggested that, although the shampooing process is an operation of great sanitary value, the ordinary member of our working classes, who does not suffer usually from too little work and too much food, does not require this corrective; and that this modification of the Turkish bath, therefore, for all ordinary purposes of ablution would be perfectly effective, less provocative of colds, and more economical than the ordinary warm slipper bath. Although this form of bath has not been tried at all, I think it is a form of hot-air bath extremely suitable for the second-class division of the hot air baths of the Central Establishments, and for this reason I recommend some of the promoters of our future establishments to give it fair trial. In Vienna, it should be mentioned, no shampooing is given in the hot-air baths unless specially asked and paid for.

The hot rooms should be so arranged and constructed that their walls may be exposed as little as possible to any cooling influences. For this reason their internal walls, floors, and ceilings should be separated by a cavity, and finished internally with such materials as will not be affected by high temperature (and in the Russian bath by steam); and moreover should be capable of being constantly cleaned down with water.

The walls and ceilings are best lined with glazed bricks, the ceiling being arched or vaulted. The floors should be of York stone, or mosaic as described, to the gangways of the swimming baths. If these rooms are under any other rooms, the floor above should be fire-resisting and heat-proof. It is a moot question abroad whether there should be fixed benches, or suitable chairs, movable benches and tables. In most of the Continental establishments, where fixed benches are used, their tops are generally of white marble 2′ 0″ wide with the risers of glazed bricks.

The heating of this bath may be effected by steam, as in many of the Continental examples, or, what is more common with us, by its own independent furnace.

In concluding my remarks upon this department, I would like to draw your attention to the hot-air and vapour baths shown upon the plans of the baths at Frankfort, Stuttgart, the Admiralgarten Baths at Berlin, and others.

THE ESTABLISHMENT WORKING DEPARTMENT.

The most convenient position for this is on the ground floor, but, failing this, it may be located in the basement of the establishment; but care should be taken in that case that good lighting and ventilation are secured for it. In the frequently very costly and restricted sites available in London for these large establishments, this is a matter of extreme difficulty.

The following are the various rooms &c. required :—

Boiler house, with coal storage; engine room; accumulator room; receiving room; washhouse; drying room; folding and distributing store rooms; mess room; engineers' workshop.

Boiler House.—The usual and probably the best means of heating the water in the ponds is by the injection of steam combined with circulation. To carry out this system properly, and for the production of steam and hot water for the requirements of the establishment generally, the services of three large steel boilers of the Lancashire type, adapted to a working pressure of at least 100 lbs. per square inch, will probably be required. It is usual to make each of these boilers interchangeable for either steam or hot water.

In comparison with the foreign boiler houses, our own present, frequently, a very rough and untidy appearance. The boiler house should be well planned, with good lighting and ventilation, and care should be taken to avoid such an involved system of pipes and fittings as we so often see. The openings to the coal bunkers (which preferably should be in front of the boilers) should have some convenient form of iron sliding doors so as to keep the house free from dust when coal is being delivered.

Engine Room.—This should have a horizontal engine of sufficient power to drive the laundry and other machines. In the same room, or preferably one closely adjoining, it will be convenient to place the high-speed steam engine and dynamo for the generation of the current for the lighting of the building, together with the main switchboard. Should there be an Artesian well, then a room should be provided for the pumps, &c.

Accumulator Room.—This may conveniently adjoin the electrical engine room; its arrangement and size depend upon the form of the batteries and their capacity.

Receiving Room.—This is the room to which all the dirty linen of this and the other establishments of the district would be conveyed. It should be conveniently arranged so as to be easy of access from the courtyard, and, if in the basement, the dirty linen should be passed down a shoot arranged for the purpose.

Washhouse.—This would be arranged to take the necessary washing machines, rinsing and boiling tanks, and hydro-extractors, driven where necessary by overhead shafting and belting. All these appliances would require to be adapted in capacity and number, according to the amount of work required to be done. Care should be taken to arrange the various machines &c. in the ordinary sequence of the washing process, by which means time and labour are saved.

Drying Room.—The ordinary system of steam-heated drying closet combined with blast apparatus is perhaps as good for this purpose as any other. The horses may be of the usual draw-out character, and should be from thirty to fifty in number. In the foreign examples, these drying horses are constructed entirely of hard wood, and are of course much more easily moved, and they appear to be perfectly durable.

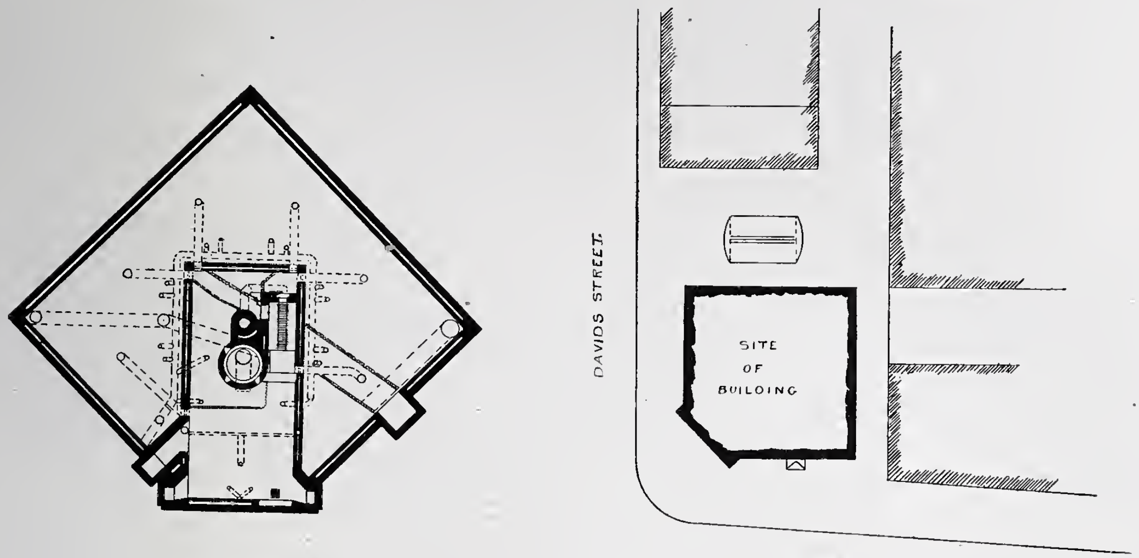
In some of the Metropolitan establishments this operation of drying is very effectively and quickly done by the towels &c. being passed through a steam-ironer.

Folding and Distributing Store Room.—The towels &c. are brought to this room after leaving the drying closet, mangled in the box mangles, or passed through a steam ironer, folded and deposited in the adjoining distributing linen store, from which they are given out to this or the branch establishments.

Mess Room.—This should be a comfortable room for the use of the men working in the basements. It should have a small cooking stove, and a supply of lockers to take food &c.

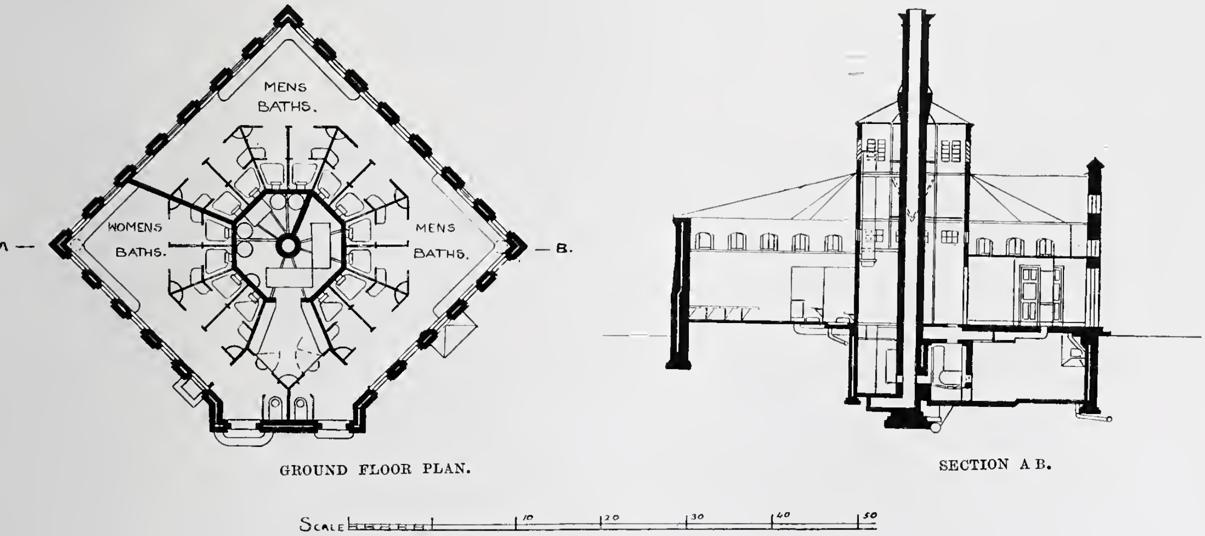
Engineers' Workshop.—This requires to be a well-lighted room with a steam-driven screw-cutting lathe, a steam-drilling machine, a carpenter's bench, a smith's forge, anvil, and a grindstone. A store should adjoin it for material, tools, &c.

Ventilation.—I have said nothing hitherto about the general warming and ventilation.



BASEMENT PLAN.

BLOCK PLAN.



GROUND FLOOR PLAN.

SECTION A B.

FIG. 12.—PEOPLE'S BATHS AT ST. PAUL'S, HAMBURG.

These questions, together with that of the engineering generally, would take a whole evening alone to discuss. I will only remark that they deserve much greater attention than they generally obtain with us. With reference to ventilation, it is not enough to rely entirely on natural means; these bathing establishments require the very best mechanical means of frequently changing the air in a regular manner, applied to nearly every part of the buildings.

Upon the Continent a well-devised scheme of ventilation combined with warming is arranged with the initial planning of the building.

Administrative Department.—The following offices will be required for the transaction of the business of this and the various Branch Establishments: Committee room, with cloak room, lavatory, &c.; clerks' office; superintendent's office, ground floor; suitable apartments respectively for the superintendent and the engineer, with separate entrances to them.

I have, I regret to say, been prevented by pressure of work from preparing plans of this typical Central Establishment.

BRANCH ESTABLISHMENTS.

It will be remembered that the primary motive of these Branch Establishments is that the chief proportion of the ablutionary baths for the poor, and the whole of the public washhouse facilities, should be accommodated in much smaller buildings, erected at much more frequent intervals throughout the poor and populous neighbourhoods; and that I have divided these Branch Establishments into two types and sizes of establishments, calling the first "A" (Baths and Washhouses), and the second "B" (People's Baths). Typical plans of both are given. These, although but little more than sketches, will serve to sufficiently illustrate my suggestions.

TYPE "A" (BATHS AND WASHHOUSES).

This, the larger of my Branch Establishments, is capable of being accommodated on the site of four small houses, and preferably a corner one. Those on the plans are respectively 80′ 0″ by 80′ 0″, and 80′ 0″ by 42′ 0″. In both sets the establishment accommodates on the ground floor the public washhouse, and on the first and second the slipper and rain-douche baths. The basement readily in this case accommodates the boilers.

PUBLIC WASHHOUSE.

The present arrangement of the public washhouse in all its details requires overhauling; and in describing the small installation here, the direction of some of these will be indicated.

The accommodation in both sets of plans is strictly limited to compartments for from twenty-eight to thirty-seven washers, the whole of which is contained on the ground floor. The following rooms are required and shown:—Washhouse, mangling room, waiting hall, cloak and bonnet room, crèche, ticket office.

Washhouse.—In order to plan this apartment properly, we must first of all decide what arrangement of drying closet shall be adopted. The common and in England the invariable practice is to collect the drying horses into one or more steam-heated closets down one side of the room, with the washing compartments arranged on the other side of it. Each washer has the sole use of a washing compartment and one drying horse, both numbered to correspond. The compartments are usually ranged back to back, preferably down both sides of a short bay, and opening at the drying closet end on to a good wide main passage or gangway. This arrangement, whilst it minimises passage space, keeps the whole of the washers under the eye of the attendant, in patrolling the main passage between the compartments and drying closets. It also admits of some little classification of the *habituées* of the establishment—a very desirable point. Each compartment is about 3′ 6″ wide, 2′ 0″ in depth, and 4′ 6″ high, and contains ordinarily two troughs; one, that at the back, for boiling and rinsing, and the other for washing. Steam is supplied to the back trough for boiling purposes, and hot and cold water supplied to either by means of two cocks with long movable nozzles. The main

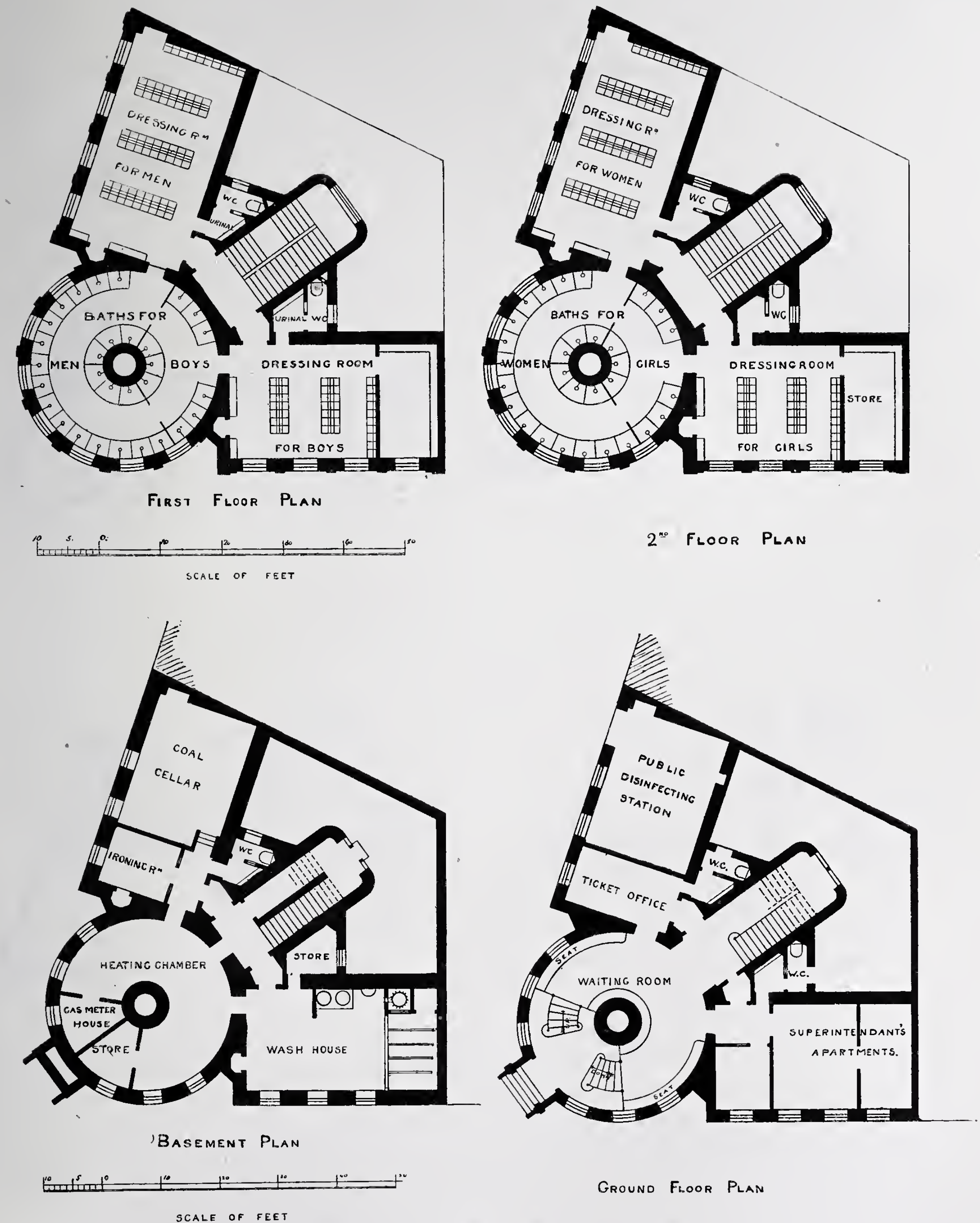


FIG. 13.—PEOPLE'S BATHS, SIXTH DISTRICT, ESTERHAYZ STREET, VIENNA.

hot and cold water supplies may be carried upon iron standards fixed along the top of the divisions, whilst that for steam should be carried along under the floor with upward branches to each compartment.

Along the top of the back division is fixed a wooden latticed shelf to take the linen when washed, and underneath receptacles for soap and soda. The divisions are commonly constructed of cast iron, galvanised or painted; but it is greatly to be desired that some other material could be used for them. I know of no kind of painting that will stand the hot soap and water, and the galvanised metal gets to look in time unutterably dirty.

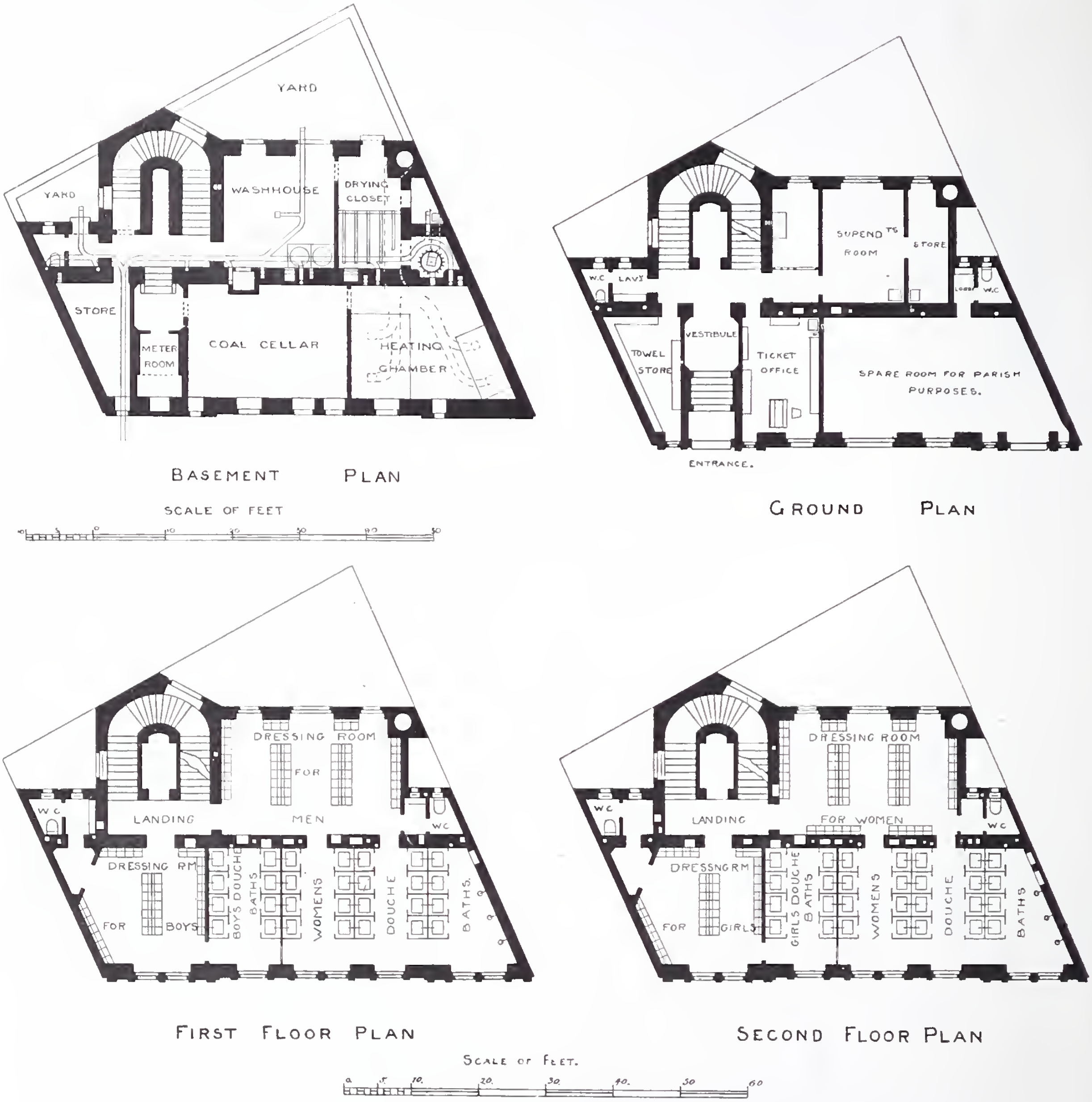


FIG. 14.—PEOPLE'S BATHS, FOURTH DISTRICT, KLAGBAUM STREET, VIENNA.

The clothes, after having been washed, boiled, and rinsed, are then taken to the hydro-extractors or centrifugal wringing machines, which removes about 50 per cent. of the moisture from the clothes. It is a great mistake to employ the large-size machine one so frequently sees for this work, and when the gearing is overhead it is then very cumbrous, if not absolutely dangerous. To prevent this, the machines should be of a smaller diameter, 22″ say, and increased in number. They should be entirely underdriven, and so arranged that the washers may readily use them without danger or even supervision.

The heating of the closet is by means of coils of steam pipes, by which a temperature of 140° Fahr. should be maintained, and in conjunction with *efficient* ventilation the articles of the washers should be dried in twenty minutes.

In this matter of drying the clothes there is room for much improvement; for although there are several modes of effecting the process, none are perfectly satisfactory. Another point of importance is a better control by the washer of her own drying horse. In the old days of the Baths and Washhouse movement, a system was introduced, consisting of the combination of the drying closet with each washing compartment, and this was carried out in some few establishments, notably those in Glasgow, London, Hamburg, Berlin, Augsburg, and Metz. Although apparently this system was abandoned, it yet to my mind contains the germ of a perfectly practicable solution of this part of our problem.

Almost more than any other department, the public washhouse demands the best attention and skill of its architect and engineer, to find some efficient means of removing the large amount of vapour that in certain states of the atmosphere accumulates about its upper part. It is, however, a part of the very important question of the ventilation of all parts of the building, into which I must not go to-night.

The drainage into open channels from the wastes of the troughs, and the general surface drainage of the floor, together with the material and construction of the latter, require great care. The walls should certainly be faced with glazed bricks, and the construction of the skylights and interior of roofing over be of such a character as to be unaffected by moisture. It may be useful to remember that the average stay of a washer in the public washhouse is two and a half hours, and that the average quantity of water used by her is about forty-five gallons.

MANGLING ROOM.—This adjoins the washhouse, and should contain one large and one small steam-driven box-mangle, and tables for folding, &c. Little or no ironing is done in these establishments, the washer preferring to do this at home. It is well, however, to provide a small gas stove for heating irons to meet the very occasional demand.

WAITING HALL.—A considerable amount of waiting takes place in this department, and provision should be made for some fifteen to thirty washers, each one of whom may possibly be waiting to take her turn in the washhouse as a compartment becomes vacant.

CLOAK AND BONNET ROOM.—The best form of fitting this is by means of a series of small ventilated cupboards with lock and key; the same key should also be made available for the drying closet, corresponding in number of ticket or tally. If room can be found to provide a dry receptable for bonnet, shawl, &c., in the washing compartment, so much the better.

CRÈCHE.—This is quite a new provision, and is really the outcome of an experiment which has recently been made in Edinburgh, and has been found to be a great boon to the frequenters of the washhouse. It consists of a large, light and airy room immediately adjoining the washers' entrance; where any washer having young infants, with no one to take care of them at home, may leave them here free of charge during such time as she is engaged in the washhouse. In addition to the large room, a store room, bath and sink room and w.c. should be provided.

In the first days of the movement it used to be customary to provide for two classes of users of the washhouse, and in any provision for more than fifty washers this practice might with advantage be resumed.

Baths.—These are proposed to be accommodated as follows:—slipper and rain-douche baths for men upon the first floor, and with a due proportion of same on ground floor for women. One class of bathers only is catered for in these establishments, but there would be some difference in the prices charged for the use respectively of slipper and shower baths. A large waiting room with table, chairs, &c., is provided for each group. The second and third floors are appropriated to the use of the manager and his wife. The basement will amply provide for the necessary boiler, engine, &c., for the requirements of the building and storage for coal.

TYPE "B" (PEOPLE'S BATHS).

This, the smaller type of my branch establishments, is intended to meet, in the very cheapest and simplest manner, the needs of the very poor for cleansing facilities. It consists of very small establishments of rain-douche baths, built at very frequent intervals, in the poor and populous districts, after the manner of the Germans and Austrians, to the different systems of which countries I have already referred. There is a fear in some quarters that this system of warm and cold shower baths would not conform to the Baths and Washhouses Acts. This view is readily corrected by a reference to the Amending Act of 1847.

The accommodation consists of the double cells, 6′ 0″ × 3′ 3″, serving as dressing room and washing compartments. The temperature of the water would be limited by mechanical means to a temperature of 98° Fahr.; and the supply of this and the cold water is regulated by levers in the foot gratings or by chain pulls. The average supply of water consumed per bather in this bath is found to be about thirteen gallons. The divisions to the compartments should be constructed similar to those named for slipper baths.

These establishments can be made so small and compact as to permit of their erection under our streets in a manner similar to our underground lavatories and conveniences, and I trust ere long to see them so provided.

CONSTRUCTION.

Every part of the public baths, especially those used by the rougher class of visitors, is subject to very rough treatment. The construction should therefore be of such a character as to be able to resist the action of water in every form, whether from carelessness or from the necessities of frequent cleansing. Every part should be comfortable in its arrangement and appointments; and yet easily kept clean, free from vermin, and especially so with respect to the transfer of contagious matter; and last, but not least, it should give the impression of neatness and scrupulous cleanliness in all its parts.

The task of satisfactorily complying with all these requirements in institutions of this kind is by no means an easy one, especially when coupled with the necessity for wise economy in their resolution. Fortunately the evil results attending the adoption of materials and labour of a cheap and unendurable character are now more generally appreciated. Such a policy has too frequently carried with it its own punishment in the form of excessive periodical repairs, and frequently the cost of entire structural renewal at an early date.

ARCHITECTURAL TREATMENT.

Upon the subject of the external architecture of baths and washhouses, I would venture to recommend the general adoption of the principle, that the design of the building should clearly express its purpose, quite apart from all questions of style. I mean that a bath and washhouse establishment should appear exactly what it is, and not ape the dignity and expression of the modern town hall. In the treatment of the natural outcome of the plans themselves, there are infinite opportunities for an original and distinctive treatment peculiarly suitable to its purposes and expressive of them.

It will be seen that the subject of this Paper is a very large one, and that it is impossible to do justice to it in one evening. I have, however, done my best with each portion of it relatively to its importance in the time at my disposal.

DISCUSSION OF MR. TILTMAN'S PAPER.

Professor Aitchison, R.A., *President*, in the Chair.

Mr. Wm. EMERSON, *Hon. Secretary*, in proposing a vote of thanks to Mr. Tiltman for his very able Paper, said he should like to have heard something as to the best method of constructing a large swimming bath to hold water. He had hoped that on the question of construction Mr. Tiltman would have touched on that point.

Mr. H. L. FLORENCE, *Vice-President*, in seconding the vote of thanks, said that he had not quite understood the rain-douche arrangements. If bathers had to use the rain douches before entering the swimming bath, it would lead to a great revolution in the general plan of the baths, because it would seem necessary that the dressing boxes should be in direct communication with rain douches; otherwise, if they were put in their usual position round the swimming bath, there would be no guarantee that the bathers would take the douche before entering the bath. Considerably greater space would probably be necessary in order to provide dressing boxes and rain douches, for a pathway round the bath would still have to be provided. The system of rain douches, however, would be much to the advantage of the people if they could be induced to take kindly to such a novelty. He scarcely felt inclined to agree at once with the use of the York pavings for the landings round the bath. He had always found slate the most suitable and the most pleasant material for that purpose, and it was easier to keep clean.

Mr. A. T. BOLTON [*A.*] observed that the last speaker might have told them that he was the architect of one of the oldest baths in London, and one of the few that could claim to be self-supporting. One of the great difficulties of London baths was to make them self-supporting, and the baths in the West-end to which he referred owed their prosperity, he believed, to a large extent to the extensive patronage of the first-class swimming bath. Mr. Tiltman said that the baths should not be in the nature of town halls. Unfortunately, the particular bath he (the speaker) was alluding to had to do duty as town hall, and the use of it during the winter for meetings and entertainments constituted one of the difficulties of the management. It would greatly simplify matters if baths were to be used only for bathing, for there was much difficulty in providing sufficient exits and entrances and other requirements that might be necessary in a public hall, but which were not so in a bath. Mr. Tiltman thought the County Council would not allow of staircases up to the gallery in a case where the gallery might be used for dressing boxes. But in this particular bath, though they had a severe struggle with the London County Council when applying for a licence to use it for music and dancing, this was not one of the points objected to. The gallery in this instance had two circular staircases at one end for access on either side, for the sole use of bathers when the gallery had to be utilized for dressing boxes. With regard to the noise of the swimming bath, that was a matter worth more attention than it seemed to the speaker to have received in the design of these buildings. It arose from the excessive amount of glass in the roof. Glass was a bad substance from an acoustic point of view; every splash of water was re-echoed from the glazed surface. If the glass area in the roof could be restricted or confined to a cove or to the vertical sides of a long lantern or clerestory, leaving a central part of some other material, it would be very much better. That was the great objection to the otherwise excellent fittings of the Westminster Baths. The water chute there was a most alarming apparatus to quiet bathers; and for that reason it could not be introduced into the bath he had spoken of. The better-class bathers did not also care for another feature of the Westminster Bath, the overhead shower, which was delightful in summer. Jets of water were sprinkled all over the bath from a perforated pipe running down the centre of the roof. Ferns could be grown in baskets suspended from the roof, and the atmosphere was kept nicely cool, but many swimmers were very sensitive on the point, and objected to being sprinkled while swimming. In the bath built by Mr. Florence there was a fountain at one end, which was objected to on the same score. Separating the entrances for men and women, and having two separate ticket boxes, had not always been found necessary. Great economy could be effected by having only one ticket box, approachable on either side, so that one clerk could attend to both. The addition of a refreshment room to the bathing establishment had often been called for, but was difficult to arrange for in the old class of bath. If it could be combined in some way with a tea shop, under other management, for which rent would be received, it would be profitable to the bath proprietors and agreeable to the bathers. In regard to the general treatment of our bath buildings, it was to be regretted that they so often were mainly utilitarian in design. The Arabian baths at the Alhambra in Granada, with their vaulted roofs perforated with star openings for ventilation, might be suggested as an ideal.

Mr. A. SAXON SNELL [*F.*] said that any one who had had the privilege of going over the new swimming bath at Shoreditch would feel that great strides had been made towards the ideal in baths. It would seem that at last imagination was beginning to touch even our vestries and municipalities, and when our rulers and clients began to "dream dreams" it was good for architects. With regard to providing small bathing establishments, great economy might be attained by using them on alternate days for men and women. It would be found that the bathing time for men and women differed very much: women generally went in the morning, and men nearly always in the evening. In one large borough where he was building some baths, the idea was to economise superintendence by erecting several baths and spreading the officers over them as required. He agreed with Mr. Tiltman upon the question of having small establishments instead of large ones, because of the difficulty of getting people to go to big central baths; they were not so popular as they ought to be, because they were distant from most of the homes of the people. The description of the shower and rain-douche baths was interesting, and would very likely be followed by a great increase in their numbers in London; it was to be hoped so, because they could be made and administered so cheaply. He had read an account of a manufacturer in the North of England who provided these shower baths for his workpeople; and he found that they could be built and maintained at a very small cost. Such baths would be a great boon in London. With regard to entrances he went one step further than Mr. Bolton, he hoped separate entrances for men and women would be abolished altogether; they were a nuisance in planning and an expense in administration. They were no more necessary in public baths than in railway stations. As regards the size of the bath, he was glad to hear Mr. Tiltman say that he thought the maximum size should be 100 feet by 35 feet. A hundred feet was a very good racing length, and 35 feet was quite wide enough; in view of the enormous expense of water alone, those dimensions should suffice. Slipper baths on the first floor were practicable, but he did not agree with Mr. Tiltman that they should be on more than one floor. It was better they should all be on one floor, because sometimes the slipper baths were little used except at certain hours of the day, and it was an economy to have one attendant to attend to two sets of baths, which would not be possible if they were on different floors. At the Marylebone Baths some of the dressing boxes were arranged in transepts. He was surprised to hear Mr. Tiltman say that the internal angles of the swimming bath should not be rounded—unless he meant that they should not be rounded to too large a radius, which would interfere with swimming races. He would prefer to have not only the vertical angles rounded, but the angles of the bottom with the sides also. With regard to woodwork dressing boxes, he had a preference for the old fashion of woodwork and doors, thus insuring that privacy which many people still considered a desirable thing. Paints were to be had which were absolutely impervious to wet, and wooden boxes painted with these paints could be kept perfectly clean, because the hose could be turned on to them without injuring the wood.

The PRESIDENT said he hoped most ardently that slipper baths and other abominations would be done away with as soon as possible. Our idea of cleanliness seemed to be first to wash our dirt off into something, and then to wash ourselves in it. The shower and rain baths referred to would do away with that. He recollected a Member of Parliament, one who was prominent in starting the Turkish baths, pointing out that there was no sense of cleanliness amongst Europeans generally. To find it they must go to the East, where people took care that the water they had once washed in should never go over their bodies again.

Mr. TILTMAN thanked the Meeting for the kind reception they had accorded his Paper, and explained that owing to deafness he had not been able to follow the discussion, and so could not reply at present to the criticisms thereon. He then drew attention to some plans of the German baths referred to in the Paper, and explained their points of interest.

Mr. Tiltman, having been furnished with a proof of the discussion, sends the following reply:—

The simplest and best method of constructing a large swimming pond is to have a good, sound, and equal foundation for it; to form the shell of Portland cement concrete, the inside of which should be rendered in cement and lined with asphalte. After the tank has been tested by being filled with water, it may then, if found watertight, be paved with white glazed bricks or other equally suitable material. There is no particular novelty in this mode of construction, but with the great care exercised, I have never had a serious leakage in any of the many ponds I have built.

As to the effect upon the arrangement of the dressing boxes of the swimming baths, by the adoption of the preliminary warm douche advocated, I may say, from what I saw of the German baths, that, providing the douches are liberal in number and conveniently arranged at one end of the bath, no alteration in the general plan appears to be required. There is but little doubt in my mind that the rule was the reverse of irksome to the bather, and that it was there, and could be with us, an additional attraction of the swimming bath, providing the water is kept suitably warm, and the room of the temperature required. I have tried both slate and York stone for the paving of gangways; in my experience the former wears greasy and slippery, whereas the stone is generally free from these and other objections. I shall be glad to show Mr. Florence, or any others interested, the two materials in use.

Experienced superintendents of these institutions I find frequently would prefer the separation of the ticket-boxes *for classes*, rather than that for the sexes; but it is very seldom that it is either practicable or even desirable to have all classes of patrons entering at one point of the building. In any case, the entrance to the public washhouse must be kept separate from that for bathers. Generally for the Central Establishment described by me, I still adhere to the recommendation made upon this point in my Paper.

There is no gainsaying the advantage of having all the slipper baths upon one floor, except in the circumstances referred to by me; but, subject to this, Mr. Snell's point is always worth remembering. My reference to the non-rounding of the internal angles of the pond was certainly not intended to include this necessary provision for the angles of the glazed brick-lining, but was, of course, applicable only to the practice still very common of rounding to a large radius the curb-edging of the pond. As to the inadvisability of painted wooden dressing boxes for the rougher class of swimming baths, I am inclined to think that when Mr. Snell has faced the criticisms of many committees and the managers of their establishments for nearly twenty years he will have altered his views upon this point.

Mr. E. Harding Payne [*A.*] sends the following contribution to the discussion :—

In contributing a few notes on Mr. Tiltman's able and exhaustive Paper, I do so as a swimmer of many years' experience, still taking an active part in swimming and legislation for the sport. While agreeing that more might be done in inculcating the desire for, and necessity of, cleanliness amongst the poorer classes, it must be admitted that very great strides in this direction have been made during the past few years by the voluntary teaching of swimming in Board Schools all over the country. Since the London School Board has recognised swimming as a branch of physical exercise, the London Schools Swimming Association has made great progress, and their Report for 1898 shows that nearly five hundred schools are affiliated to them, and that 40,000 children were instructed last year, four boys and one girl receiving the Royal Humane Society's certificate for saving life. Their efforts are still much confined, owing to insufficient accommodation and want of teaching baths.

Now that the children are taught by means of a drill, it is possible for one teacher to instruct a whole class of sixty children at word of command, and two small baths, each 45′ 0″ × 15′ 0″, side by side, would be sufficient for this number at one time, or one large bath, 45′ 0″ × 33′ 0″, divided by a bridge, would answer the purpose. There are special details that would have to be considered in a pond of this kind, and it would be much better if a bath for each group of schools could be devoted entirely to the purpose of teaching. While for economical reasons a more limited main frontage is to be advocated, at the same time for larger establishments a frontage in a leading thoroughfare is essential to attract the passers by, especially in warm weather, and this would tend to financial success. The quadrangle system suggested is no doubt advantageous on some sites, but it must not be overlooked that there is an extra cost in the erection of porter's lodge, and building four frontages instead of one, in addition to roadway to be kept up and porter's wages, as against any saving in corridor. It is a mistake to make swimming baths of such large dimensions. Four baths, if suitably placed, of the size of Kennington Road and Hornsey Road baths would be sufficient for the whole of London, were the seating properly arranged so that a large number of spectators could be accommodated. Baths should be smaller and more equally distributed among the population. 100′ 0″ × 35′ 0″ is the best size for a first-class swimming pond.

The gallery accommodation in most swimming baths is little better than useless. Even where the gallery floor is stepped, it is generally impossible for more than one row of spectators to see comfortably what is going on in the swimming pond, and then only by leaning over the gallery rail. If the baths are to be used for these entertainments at all, it is time some better arrangement was adopted. One attempt in this direction has been made at Leicester, where the gallery is in the form of an amphitheatre stepped up from the gangway level, with the dressing boxes at the back, and openings at intervals for access to the bath. As this particular bath is on an open site, it has been possible to get external light and ventilation for this back corridor, which in restricted sites could not be obtained, and would be a fatal disadvantage quite apart from the difficulty of supervision. But for swimming displays or public entertainments or meetings in the winter, the Leicester bath is a distinct advance. Another endeavour to meet the difficulty has been tried at

Shoreditch Baths, where expensive collapsible boxes under the gallery are provided. Whether the space gained justifies the expense seems doubtful.

I quite agree that good York stone is better than marble and slate or any of the other materials generally used for the gangways. A better decorative appearance might perhaps be obtained if used in conjunction with some other material. India-rubber would present an ideal non-slipping surface, and, if more durable, would be better for the purpose than any material now used.

There are other features connected with the first-class swimming baths that are overlooked in many cases. A means of communication from one end of the bath to the other within the building, but outside the bath, is absolutely essential where baths are used for swimming entertainments, and seems necessary for most purposes to which a bath could be put when used as a hall. Again, it does not seem well that the Referee's platform and press accommodation should be left to an afterthought; if provided at all, they should form part of the original design.

I feel sure that to increase the number of dressing boxes in addition to those usually provided down the two longer sides of the swimming bath would be a mistake. When all the dressing boxes are occupied the bath would be uncomfortably crowded. Again, arranging boxes in transeptal bays would, I think, be encouraging theft, which even now cannot be entirely prevented, owing to difficulties of supervision.

The rain-douche bath is a most excellent way of providing an economical and efficient bath, and will, I hope, be given a fair trial. Its adoption was suggested some years ago in connection with collieries, and seems admirably adapted for a large number of persons to bathe with celerity. The proposal that they should be used in connection with swimming baths is excellent. It would be an advantage in the case of second-class swimming baths, but would be treated more as a luxury among first-class bathers. It is doubtful whether they would not prefer to use the warm douche, followed by the cold douche, after instead of before the swim. The idea is not altogether new to our swimming baths. At the old Lambeth Baths twenty-three years ago, and at the Crown Baths, Kennington Oval, at a later period, there were hot water fountains, but, as bathers congregated about them, they were found to be a nuisance, and were removed.

I would suggest that where easy communication can be made between the first-class slipper baths and the swimming bath it should be done, so that bathers for an extra fee could have a cold plunge after a warm bath, a luxury which would, I feel sure, prove popular.

There always seems a doubt as to how many slipper baths to provide. Space might with advantage be left for future extension of the different classes until the requirements of the district can be discovered from actual working.

9, Conduit Street, London, W., 11*th February* 1899.

CHRONICLE.

Election by Recommendation of Allied Society.

At the Council Meeting of Monday the 6th inst. the following gentleman, unanimously recommended for membership by the Council of the Allied Society at Bristol, and found to be eligible and qualified according to the Charter and By-laws, was, under the proviso to By-law 9, duly elected Fellow of the Royal Institute:—

George Herbert Oatley, Edinburgh Chambers, Baldwin Street, Bristol.

The Home Insurance Building Fire, New York

The Science Standing Committee send for publication the following letter received by their Hon. Secretary, Mr. Searles-Wood, from Mr. R. W. Gibson, the author of the Paper on "Fireproof Construction in the United States," read before the Institute on 5th December last [p. 49]:—

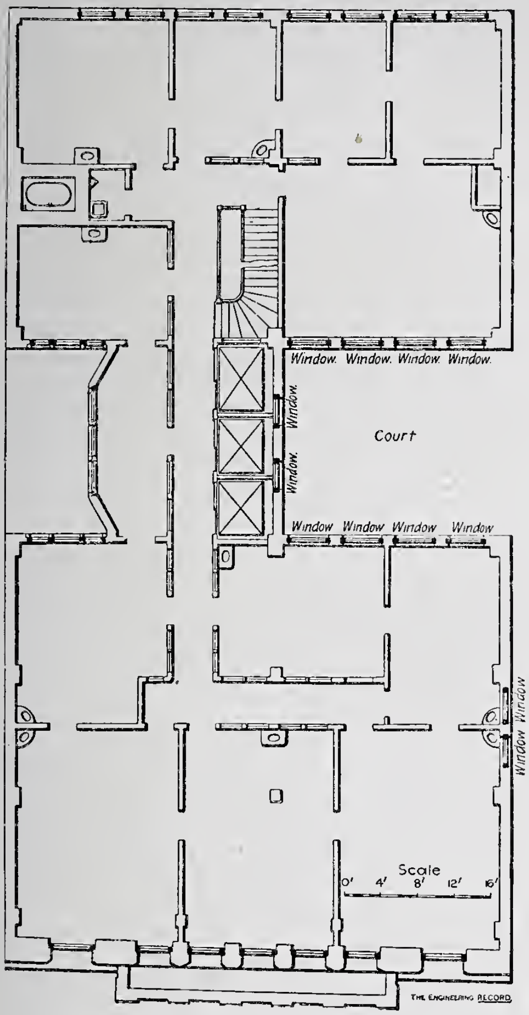
"Since I sent you my Report on Fireproof Construction we have had a great fire, which has confirmed my opinions in most complete fashion. It was in one sense an unfair test, because the fireproof building was subjected to an intense heat generated in an adjoining non-fireproof building, while a gale blew from that side at 60 miles an hour, or more, making the high building (which had a court recessed in its side) practically a chimney for the terrific fire, with *windows in the chimney*.

"I am sending you a number of the *Engineering Record* and a collection of newspaper extracts, which you will find to contain a complete account and many comments.

"It is a vindication of the fireproof structure, and a condemnation of the imperfect and unthorough details. It will lead to higher insurance rates at first, then better details in the direction I have advocated—less wood and fewer windows at side. There is no 'ancient light' law here, and consequently people put windows in side walls frequently over other buildings.

"I am now designing a building to be erected this season with *no wood whatever*."

The *Engineering Record*,* duly to hand from Mr. Gibson, has a complete description of the mischief wrought by the fire upon every part of the structure, together with illustrations showing the condition of the damaged building at various points. The accompanying plan is reproduced from its pages. Some of the effects of the fire and of the lessons taught by it have already been touched upon in the JOURNAL, in Mr. Wonnacott's communication, printed at page 100; lengthy quotation from the *Engineering Record* would therefore be superfluous; but the Science Committee consider that the few following extracts may be usefully given:—



PLAN FROM NINTH FLOOR UP SHOWING LIGHT COURT.

> The Home Life Insurance building had a front of about 63 feet, and a depth of 104 feet to the west. It showed fifteen stories and a mezzanine on the front, and the main roof is 206 feet above the curb. On the roof was built a sixteenth story, for janitor's apartments, etc., and the building was surmounted by a pyramidal tower reaching to a height of 260 feet above the curb. It is indented along its north wall by a light court about 20 × 24 feet in size, as shown in the plan, which indicates the general arrangement of the floors from the ninth up, and serves to show the location of this court, which acted as a chimney when the flames from the adjacent building were driven into it. . . . The upper floors are similar in general dimensions, but vary in arrangement of partitions. Above the floor shown, the east and west walls of the light court are braced at every second story by a horizontal latticed strut in the north face of the building. . . . The Broadway front is of white marble. The building was erected in 1892 and 1893. . . . The building in which the fire originated * was filled with combustibles, and the flames, escaping through the windows and roof, were blown directly against the north walls of the Home Insurance Building. Although subjected to an intense heat, the building did not take fire for some time. The firemen entered the Home Building and endeavoured to protect it with hose streams from their engines and from the fire pipes in the building. About an hour after the fire broke out the roof of the corner building fell in. A great volume of flame was blown against the north side of the Home Building, and, converging in the open court there, was swept upward as if in a great chimney. An intense heat was thus concentrated upon the three walls of the court, and the glass in its upper windows gave way. It was said that the different stories thus caught fire independently through the court windows, and probably almost simultaneously. . . . Above the eighth floor the interior of the building is wrecked, and its contents almost entirely destroyed.
>
> Throughout these stories the woodwork and contents of all the rooms adjacent to the north court were burned. The fire did not extend south of the main corridor on the eighth floor, and on the ninth floor did not burn either south or west of the main corridors. In the upper stories some of the rooms in the south and south-west parts escaped wholly or partially. Above the eleventh floor the flames appear to have been the fiercest. In the main corridor on this floor the ironwork of the elevator shafts was badly distorted, and the flames swept through it and the rooms south of the adjacent corridor, and burned through the windows in the south wall of the court or light shaft between this building and the Postal Telegraph Building. This court is 20 × 10 feet. The corresponding windows in most of the floors above were also burned out, and the flames emerging from them scorched the woodwork of the adjacent walls and windows of the Telegraph Building, and set fire to some of the upper rooms, which were saved without serious damage. Rather less damage was done by the flames in the thirteenth floor than in the other upper stories. . . .
>
> Throughout the burned portion of the building the double wood floors were in general burned in those rooms adjacent to the north court, and in some of the other rooms, but they were not burned in all of the rooms on the east, south, and west sides of the building. The solid parts of the partitions were built of four-inch hollow porous terra-cotta blocks, and the girder webs were protected by porous terra-cotta blocks. The partitions in general stood well, except where weakened by the destruction of large areas of glazing and the wooden trim and doors. . . . Most of the plaster had disappeared from the walls and ceilings, and much of the inside brickwork was loose. In the tenth story the partition wall on the west side of the west corridor was intact, and the public toilet rooms beyond were uninjured, although the adjacent rooms surrounding the court were burned out. The contents of the sixteenth

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* 10th December 1898, a copy of which is in the Library.

* A five-story brick building of old-fashioned construction, with wooden floor beams, occupied as a clothing store by Rogers, Peet & Co., and by offices on the upper floors.

> story were destroyed, but the tower above sustained no apparent injury. In the fifteenth story one of the floor arches had fallen for a length of about 20 feet. . . .
>
> In the north-east corner of the twelfth story, some partitions, two inches thick, made with plaster or cement on a framework of expanded metal and small angles lightly secured to the floor and ceiling, although badly distorted, were effective and remained standing. In these rooms a small interior closet, having three sides and a top, was made of the same construction, and, although torn out and knocked over during the fire, was found on the floor, its original shape retained, like a three-sided box. . . .
>
> The building was of steel cage construction, with riveted columns and flat arch floors. The front wall, however, was self-sustaining and independent of the framework, except as attached to it by lateral anchors. The walls were lined and the columns encased with two-inch porous terra-cotta ribbed furring blocks, which, with few exceptions, remained in position throughout the fire. The lower flanges of the main girders where they projected through the ceilings, and the solid-web knee-bracket wind braces between columns and girders, were protected by plaster or cement on wire cloth wrapped around them, and this in general was not destroyed, although in places it was noticed hanging so as to expose the steel surface. In a few places the blocks had fallen from the columns, exposing their vertical faces, which did not appear, however, to have been injured. In the fifteenth floor a line of deep plate girders near the Broadway front, and parallel to it, projected several inches above the floor line, and had apparently been boxed in with a wooden cover, forming a step, but without fireproofing to protect them. They were found exposed and considerably buckled and deflected, although still performing their service in apparent safety.
>
> Below the eighth story there was no direct damage from the flames. Up to the sixth floor, the north court was shielded by the south wall of the Rogers, Peet, & Co. building, which is still standing. Above that point, it was exposed to the full intensity of the flames, and two or three of the lower horizontal steel struts connecting the east and west wings across the north end of the court at every second story are considerably bent and distorted, although still in position. The upper ones are hardly injured. With these exceptions, and that of the iron window frames exposed to the flames, no material injury was evident to the main structure or the steel framework.
>
> The floors consisted of transverse and diagonal matched boards nailed to wood strips on top of the steel beams, between which there was an open-air space several inches deep under the floor boards and over the arches. Throughout the building the floors were hard-burned hollow-tile flat arches, side construction with protecting skewbacks. These spaces were divided by concrete stops at intervals, built up solid from the arch to the floor board, which evidently in many cases prevented the burning of the floor through to the southern side of the building. The rooms adjacent to the large court and three corridors, and in some cases the rooms at the north-east corner on the Broadway front of the building, were most damaged. . . .
>
> The stairways and corridors were not destroyed, and the transmission of fire seems to have been external rather than internal; that is, through the windows from the outside, from story to story. The essential structural members of the building were safely preserved, and the result of the fire was simply to burn separately the contents of different rooms which were more or less independently ignited. If the windows had been protected with steel shutters, it is possible that the contents of the building would have been practically uninjured and the fire confined to the building in which it started.

Space will not permit of extracts from the little book of newspaper cuttings sent by Mr. Gibson; but expert opinion quoted therein appears to be unanimous that the claims put forward for steel skeleton buildings, when properly fireproofed and constructed, have been satisfactorily proven. The President of the New York Building Commissioners states that the building successfully resisted the spread of a blaze which, had it not been opposed by such a barrier, would have probably spread beyond all bounds, and rendered necessary the blowing up of many buildings in the vicinity, such as the Astor House, for instance, to prevent its further spread.

The Plumber's Craft.

At the banquet of the Plumbers' Company, held on the 18th ult., the President, Professor Aitchison, R.A., responding for "The Guests," said:—

The Plumbers' Company have done a most excellent work in having those plumbers that are masters of their trade certificated; and I may say that there is a great dearth of them, for when I ask builders why they have not a certificated plumber, they say it is impossible to get one.

The principal thing we require is to have men who can be trusted to wipe joints so that they are air-tight, and make other junctions air-tight too. By this means we have prevented a great many of the diseases that faulty pipes and junctions cause, and have besides improved the health of those persons who would otherwise have their health lowered by the exhalations from faulty pipes; and besides these advantages they have learned to execute ordinary plumber's work much better. We cannot be too careful of our health, for without that life becomes a burden; but at the same time we must consider "that man does not live by bread alone." Nature spreads out before us all the beauties of the sky and the earth and the ocean for man's instruction, delight, and solace, and the plumbers were of yore as skilful in embodying the beauties of nature they had admired as the other craftsmen in the building trade; in fact, when I was a boy, the plumber's shop-window was one of my greatest delights, for in it were beautifully ornamented cisterns, lead vases, lead statues, and ornamental lead plaques for dates and inscriptions, not to speak of the quaintness or beauty conferred on rain-water pipes, and their heads. All this has departed, and certainly every architect and every person of taste is anxious to see it revived. Some of the walks in Hampton Court gardens are still adorned with leaden statues and leaden vases, and when I was a boy the gardens of the great merchants in the City were adorned in the same manner, and very often with lead fountains. In the Middle Ages and the Early Renaissance considerable portions of the buildings then erected were ornamented with leaden crestings on the roof, there were lead tops to pinnacles, and lead sockets to weathercocks, and the leadwork to the lights was made in beautiful or curious patterns; and I don't know why all these charming applications of design should be utterly laid aside and forgotten for mere utilitarian objects.

The exercise of the artistic part of his craft must surely give more pleasure and pride to the craftsman than the mere wiping of a joint, however well done, or the beating out of a cesspool, besides the interest and pleasure that it causes to the public.

I hope your Company, while still continuing to instruct the workman in that which regards our health, may also add to his cultivation and interest by showing him that he has not yet mastered the whole of the craft when he can execute properly the mere utilitarian parts of his trade.

Ornamental plumbing is not entirely disused, as there is a beautiful leaded lantern on one of the churches at Brighton, designed, I believe, by Mr. Bodley.

Obituary.—Members will learn with regret of the death on the 8th inst. of George Andrew Spottiswoode [*H.A.*], head of the well-known printing firm that is conducted under his name. Mr. Spottiswoode was one of the earliest Honorary Associates of the Institute, having been elected in 1877.

NOTES, QUERIES, AND REPLIES.

Dr. Ussing on Vitruvius.

From R. Phené Spiers [*F.*], F.S.A.—

Dr. Ussing in his "Observations on *Vitruvii de Architectura Libri decem*," published by the Institute, attempts to throw discredit on their author. He says: "Instead of an excellent architect from the glorious Roman period, we find a shallow minded, ignorant man who boasts of knowledge which he does not possess." That is not the opinion of the English architects who have translated his works, nor does it agree at all with the judgment of perhaps the greatest classic architectural scholar of the day, whose loss we all deplore—the late Dr. Middleton. In his exhaustive work on the Remains of Ancient Rome, Dr. Middleton refers to Vitruvius no fewer than eighty-two times, his references filling nearly two columns of the index. There is scarcely a subject treated of in the two volumes referring to the construction of the earlier buildings of Imperial Rome, or to their decoration with stucco or painting, in which he does not quote Vitruvius as the greatest authority thereon. M. Choisy in his *Histoire de l'Architecture* continually refers to Vitruvius as the chief authority on early Roman work, and in his first lecture this year at the Royal Academy, Professor Aitchison, our President, says, "In my future lectures I shall quote largely from Vitruvius," which it is scarcely likely he would do if Vitruvius were the impostor Dr. Ussing has tried to make him out.

Sir Christopher Wren.

Mr. John Cotton [*F.*] sends the following letter, the original of which is in the Bodleian Library, Oxford, as being possibly of interest to members:—

Hampton Court. Jan: 29:
1719.

S^{r}

In answer to y^{rs} of ye 20th inst. desireing my opinion wch of the two Gates goeing into Westminster is the newist Gate & in wch Kings Reigns each of y^{m} were built: and allso abt' what time the great Gate wch goes into Whitehall was built, & by whom: I can only at present acquaint you, that I believe the two first-mention'd Gates were both built by K Henry ye Eighth: That which is next to King street & adjoyn'd to L^{d} Rochesters, I take to be much later built then ye other, The Gate wch leads into Whitehall was built by Cardinal Wolsey. As to the Boundaries of y^{r} Parish, I cannt so well inform you, as y^{r} Parochial Record's for I doe not remember I ever was imploy'd in that enquiry.—

I heartily pray for the Prosperity of y^{r} Parish, and Success in y^{r} present proceedings for ye Rebuilding y^{r} Church; and am at all times

y^{r} sincere friend & humble Serv^{t}

Chr. Wren.

To The Rever^{d} D^{r} Greene
Vicar of S^{t} Martins in
the Fields London

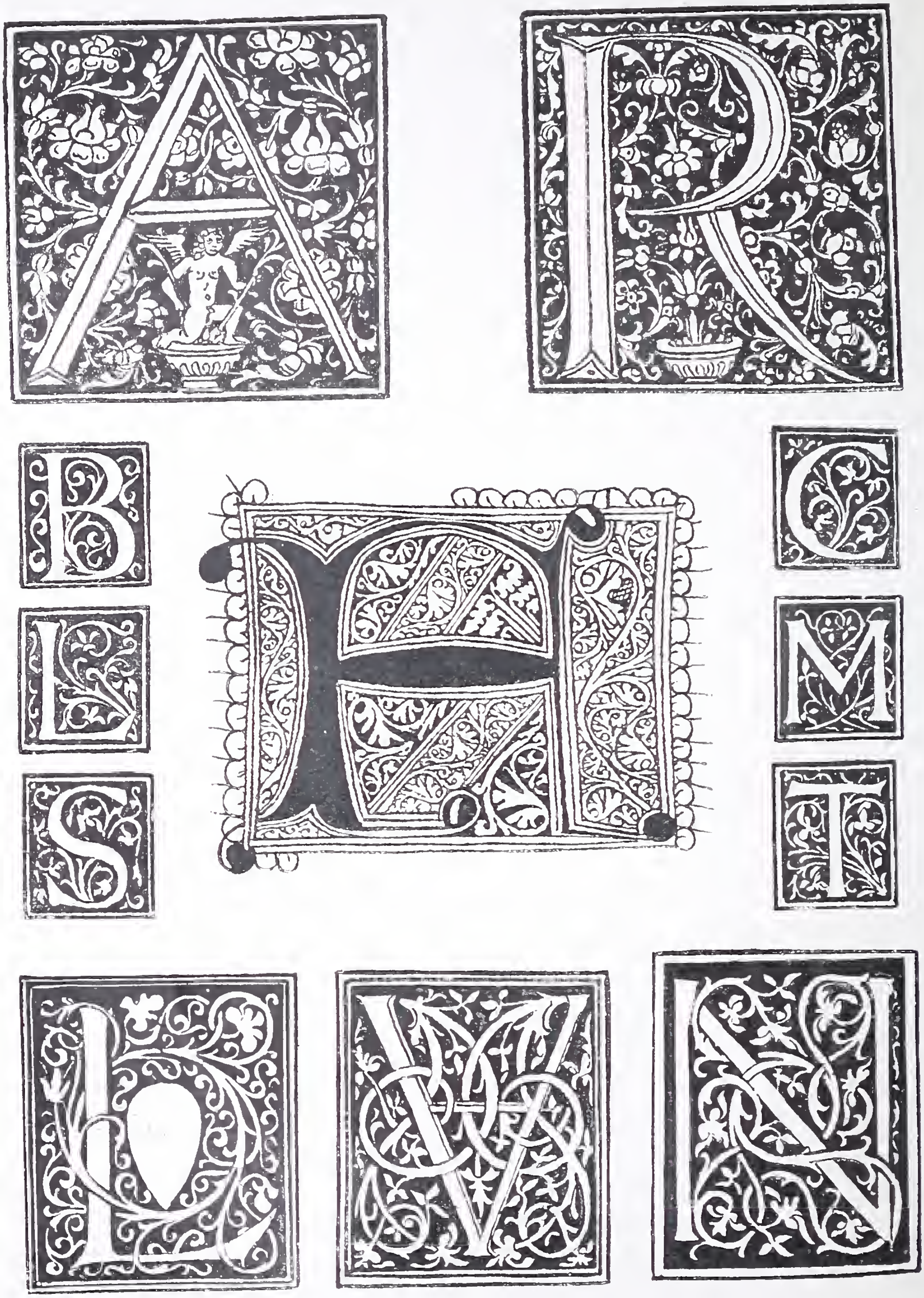
REVIEWS.

A MANUAL OF ALPHABETS.

Alphabets Old and New: containing over 150 *complete Alphabets,* 30 *Series of Numerals, and numerous Facsimiles of Ancient Dates, &c., for the Use of Craftsmen; with an Introductory Essay on "Art in the Alphabet." By Lewis F. Day. Sm.* 8*o. Lond.* 1898. *Price* 3*s.* 6*d. net.* [*B. T. Batsford,* 94, *High Holborn.*]

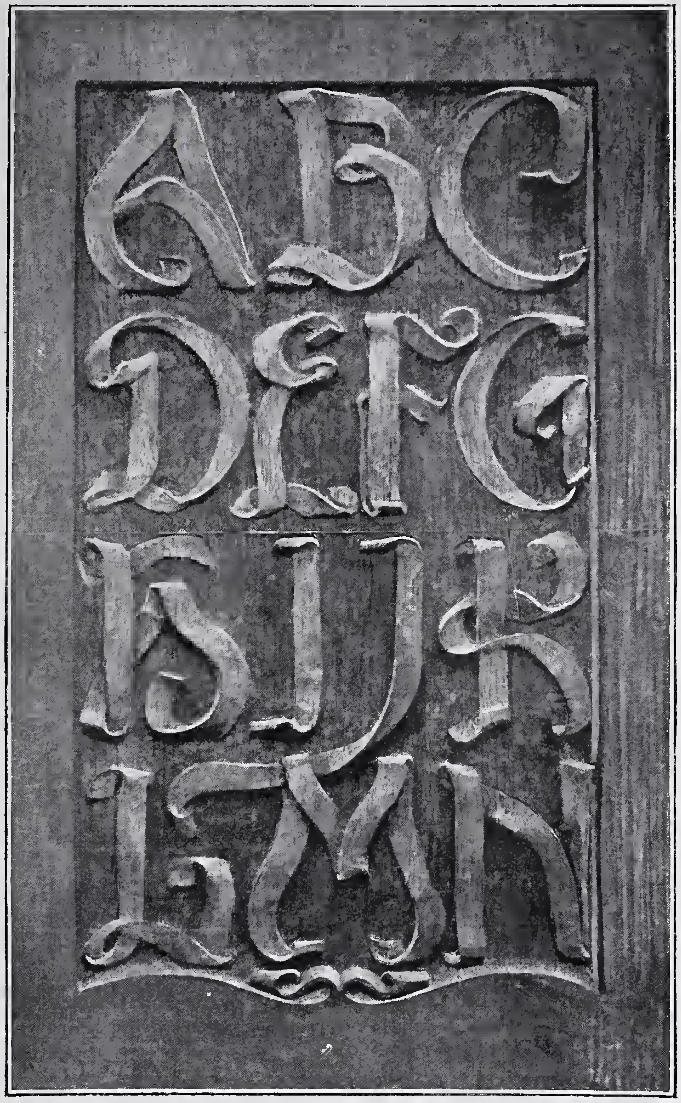
The latest of Mr. Lewis Day's text-books is likely to be as much sought after as its precursors have been, and this handsome manual of alphabets will be an improvement upon the older little unbound paper book that passes current in many architects' offices. It is perhaps scarcely so attractive to the general reader as Mr. Strange's book on Lettering of about two years ago, which deals with its subject in a less specialised manner.

Architects, being amongst the few who have preserved the old traditions of lettering, should be reluctant to adopt more labour-saving devices in the completing of their drawings, and ought not, in spite of modern tendencies, to grudge the indispensable time, more especially in the case of pupils, that the acquirement of a really good style of printing requires. In this respect it is somewhat of a drawback to Mr. Day's book that it presents rather too much of a short cut. It is laborious, perhaps, to pick out the letters from some original, or reprint, of a good example, and it will be much easier to take an alphabet direct from his pages; but a good deal of instruction may be missed in the process, as the whole effect of the type is not the same when seen as an



LATE FIFTEENTH-CENTURY EXAMPLES, FROM ONGANIA'S "EARLY VENETIAN PRINTING."

alphabet as when presented in a long passage of words. This fact appears to have been grasped by one of his contributors, an architect, who in giving his version of the alphabet adds below in his lettering, " Design letters into words." The chief lesson of the book is the extraordinary variety with which the alphabet can be rendered, and the amount of character that can be obtained therefrom, such as is revealed in the various examples given. It might be said that this element of personality has affected the representative character of this particular book, and that the author's bias is displayed in the selection he has made. In the Italian examples, for instance, some rather *outré* specimens are given, and a much finer impression of the style would be gathered from Ongania's reprint of the early issues of the Venetian press, a work just added to the Library.



WOOD-CARVING [Lewis F. Day]. From *Alphabets Old and New*.

The book before us is nothing if not up to date, but we find it rather difficult to follow the author in his treatment of old examples. This is what he says:—

" The ancient lettering illustrated in these pages has been taken, as far as might be, from original sources, and drawn with every care to keep the spirit of the original. *I have not scrupled, however, to supply the letters missing in old manuscripts or inscriptions*; for, presumptuous as this may appear to the scholar, he is not likely to be perplexed by it, knowing well the letters which would not occur in the original script; on the other hand, the practical workman, to whom the book is addressed, will be thankful, perhaps, for alphabets as complete as possible."

As elsewhere the aim of the book is described as that of illustrating the influence of the tools employed on the characteristics of the letters, we are in the presence of a serious confusion of thought and method.

Either no dates or styles at all should be given, and all old examples should be treated as fair game for use, with a sole regard to the tool employed; or else, if periods and styles are quoted, it is obvious that non-existent letters cannot be supplied, on account of the solecism that would result in a correctly imitated inscription that contained nevertheless certain impossible letters for the period adopted.

The idea of treating writing according to the tool employed is an attractive one, but it has certain limitations. Not the least of these is beauty, for not a few would decline to accept such treacly - looking letters as No. 144, whether the outcome of *gesso* on a brush or not.

On the other hand, though it may be heresy to say so, the purport of the inscription will exercise great influence on the lettering adopted. There is in the cloister of the Abbey a stone tablet charmingly inscribed in a flowing hand, that possesses the personal touch that we associate with a letter from a friend; and this is the style also of some of those quaint, and often pathetic, exhortations to be found in old country churchyards, such as commence " *O Wayfarer*," and convey sentiments that would seem to verge on the brutal, or the absurd, if rendered in a severe and monumental style of lettering, better adapted though that might be to the material and tool employed.

Of the book in general, there are 178 pages, of which thirty-nine are text, and we anticipate that the majority will confine their attention solely to the plates, and perhaps not unwisely, for frankly the letterpress is not the strongest part of the book.

The fore part is hardly made so interesting as the subject would seem to suggest, while the conclusion is an instance of the recurring difficulty writers seem to experience to-day in treating one subject at a time.

We have all an itch for cheap philosophy, and we demand so much more of our teachers than *a b c*. Our author has his ideas of the disease of this age of machinery, and in winding up his text discourses upon the subject as follows :—

" The great difference between the old lettering and the new is that in days before stereotyping the scribe was free to play variations on the well-known alphabetical air, whereas our print is monotonous as the tune of a barrel-organ.

"Pedants are never happy till everything is fixed. But nothing is fixed until it is dead—life is in movement. Philosophy has long since given up the search for perpetual motion, but that is the secret of it—life—and that is the evidence and sign of life—motion. The question is : Are we alive ?"

We may take the book as evidence of the author being able to say "yes"; and we certainly hope he will continue to be able to reply the same, for in, say, ten years' time, we can count with confidence on his joining in the laugh which this portentous excursus upon his *a b c* is calculated to provoke.

Arthur T. Bolton.

LEGAL.

Interference with Light : The Angle of 45°.

Mr. Justice Byrne, in the Chancery Division on the 23rd Jan., gave judgment in the case of Smith and others *v.* The Devon and Exeter Turkish Bath Company, which was an action for an injunction restraining the defendants from obstructing by their building opposite to the chapel the light coming to certain windows in the chapel and classrooms beneath.

His Lordship said that opposite the chapel there formerly stood almshouses, which were pulled down. Defendants having acquired the greater portion of this site near the chapel, proceeded to erect thereon baths, and over them bedrooms, intended as an adjunct to the adjoining hotel. Looking at the evidence of those in the habit of teaching in the classrooms, and at the evidence of the caretaker as to the necessity for the use of gas during three summer months, which did not arise prior to the pulling down of the old almshouses, he could not resist the evidence that there had been a material diminution of the light. One argument had been founded on the suggestion that a portion of the site of the old almshouses, not yet built upon, afforded a certain amount of diffused light, which was sufficient compensation for any light of which they might have been deprived, and that therefore he was not to say there was obstruction. But he came to the conclusion that, as the building stood, the light coming to those classrooms had been materially interfered with. Having decided the question of fact in favour of the plaintiffs, the question was—What was the proper order to make ? It was clear that there should be an order to pull down some portion of the defendants' building. He could not do better than adopt the angle of 45° obstruction rule ; and in doing so, and having regard to the narrowness of the thoroughfare, and to the other circumstances in the case, he was disposed to think that he was giving the defendants the benefit of the rule rather than imposing something stronger than he might impose. Accordingly he held that the plaintiffs were entitled to a mandatory injunction directing the defendants to pull down in accordance with a line which should allow obstruction to the angle of 45°. Defendants having failed in the action they must pay the costs of it. Concluding, the Judge said that the friction which at one time existed between the plaintiffs and defendants having, he hoped, passed away, he would suggest that some scheme should be devised by the architects of each side whereby they could agree to allow more than this angle of light.

In reply to counsel, his Lordship said the injunction would not apply to pulling down the chimneys, and the operation of the injunction would be suspended for six weeks so as to allow the parties to come to some such agreement as he had suggested. It was left to the architects to the parties to fix the point at the bottom of the classroom windows from which the angle of 45° should be drawn.

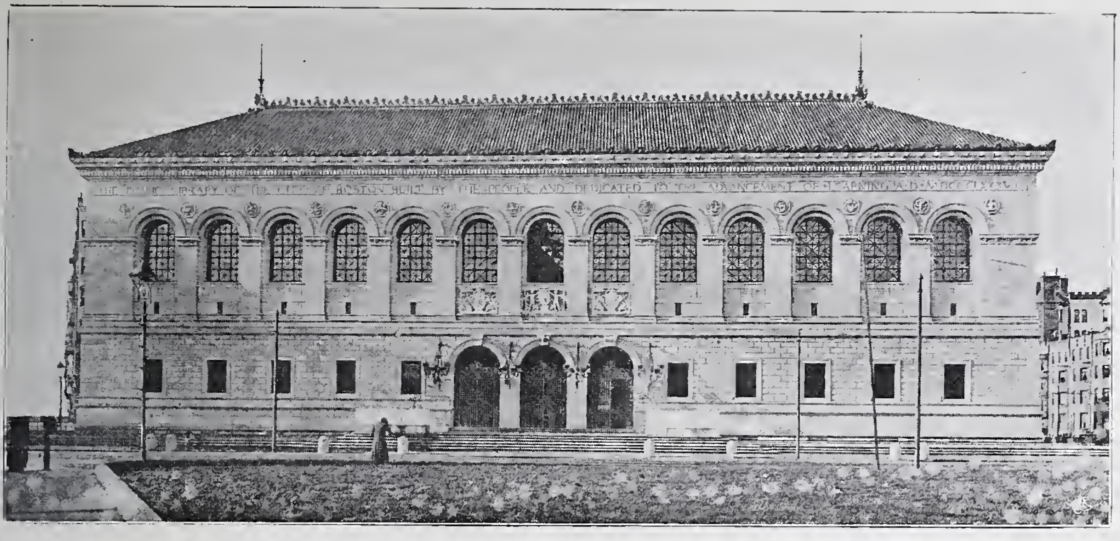
MINUTES. VII.

At the Seventh General Meeting (Ordinary) of the Session, held Monday 6th February 1899, the President, Professor Aitchison, R.A., in the Chair, with 16 Fellows (including 7 Members of the Council), 27 Associates and several visitors, the Minutes of the Meeting held 23rd January 1899 were taken as read and signed as correct.

The following candidates for membership, found to be eligible and qualified according to the Charter and By-laws, and admitted by the Council to candidature, were recommended for election, viz. :—As FELLOW, Samuel Perkins Pick [*A.*] (Leicester) ; as ASSOCIATES, Walter Hargreaves Bourne [*Probationer* 1895, *Student* 1897, *Qualified* 1898] (Darlington) ; William Alphonsus Scott [*Probationer* 1889, *Student* 1895, *Qualified* 1898] (Drogheda, co. Louth) ; Ernest Jesse Mager [*Probationer* 1894, *Student* 1895, *Qualified* 1898] ; George Reavell, jun. [*Qualified* 1898] (Alnwick) ; John Henry Arthur Phillips [*Probationer* 1894, *Student* 1896, *Qualified* 1898], Arthur Maryon Watson, B.A. Lond. [*Probationer* 1889, *Student* 1894, *Qualified* 1898], John Cubbon [*Probationer* 1892, *Student* 1894, *Qualified* 1898] (Manchester), Harry Inigo Triggs [*Probationer* 1892, *Student* 1898, *Qualified* 1898], Frederick Robert Hiorns [*Probationer* 1895, *Student* 1896, *Qualified* 1898] (Margate), John Kirkland [*Probationer* 1889, *Student* 1892, *Qualified* 1898], Edward Frost Knight [*Probationer* 1896, *Student* 1897, *Qualified* 1898], Harry Dighton Pearson [*Probationer* 1890, *Student* 1891, *Qualified* 1898], Leslie William Green [*Probationer* 1891, *Student* 1897, *Qualified* 1898], Henry Tanner, jun. [*Probationer* 1895, *Student* 1896, *Qualified* 1898] ; as HON. CORR. MEMBER, Prof. Commendatore Felice Barnabei, General Director of Antiquities and Fine Arts Rome.

The President announced that the Council proposed to submit to Her Majesty the Queen the name of Mr. George Frederick Bodley, A.R.A., as a fit recipient of the Royal Gold Medal 1899, for his executed works as an architect.

A Paper, by Mr. A. Hessell Tiltman [*F.*], on Public Baths and Washhouses, having been read by the Secretary, and discussed, a vote of thanks was passed by acclamation to the author. The proceedings then closed and the Meeting separated at 10 p.m.



THE PUBLIC LIBRARY, BOSTON, U.S.A. (Messrs. McKim, Meade, and White, architects.)

PUBLIC LIBRARIES.

By J. M. Brydon [*F.*] and F. J. Burgoyne.

Read before the Royal Institute of British Architects, Monday, 20th February 1899.

I.—THE BUILDINGS. By J. M. Brydon [*F.*].

A FEW months ago Mr. T. G. Jackson kindly favoured us with a most interesting Paper on "Mediæval Libraries," and in continuation of the same scheme it is my privilege to-night to draw your attention to the public library in its more modern aspect. The subject in itself is so full of interest, alike to the architect and the librarian, not to mention the public for whose benefit such institutions are established, that it has been deemed advisable to divide the labours of the evening, so that you may have the matter put before you from the experience of the librarian as well as that of the architect; and for the former we are to be congratulated in being so fortunate as to secure a Paper from Mr. F. J. Burgoyne, the librarian of the Central Library at Brixton, and the author of the well-known book on *Library Construction*, which has become a text-book on all that pertains to the formation of a well-regulated library. Bearing this in mind, I propose to confine myself more to the buildings from an architectural point of view, their types of plan, and the artistic expression of their purpose, leaving to the competent hands of Mr. Burgoyne the important matters of the general arrangements of the books, and the fittings and furniture most suitable for the work of a public library in the most popular sense of the term. Let me say, however, at the outset that this division of the subject does not in any way promulgate such a heresy as that a building can be designed, either in regard to its plan or elevation, without reference to its purpose or the arrangements vital to an adequate fulfilment of it; but only that we may have the benefit of the ripe experience of a practical librarian like Mr. Burgoyne in matters to which he has given special attention, and which he has been able to test by results from actual working.

I do not propose either to enter into a history of the modern library as such, or trace its genesis down from such notable examples as the Laurentian Library at Florence, the Libraries of St. Mark's at Venice, of the Vatican at Rome, of the Radcliffe at Oxford, of Trinity College at Cambridge, or the other Trinity College in Dublin—all erected by great masters of our craft; or, again, to engage in a disquisition on the educational advantages of public libraries and the impetus given to their establishment by the passing of the Public Libraries Act. I take it we are all pretty well acquainted with the one, and pretty well agreed upon the other. In spite of such poor benighted parishes as St. Marylebone, St. Pancras, and Islington in the greatest and most enlightened city in the world, libraries continue to increase and multiply throughout Great Britain and America at a rate that must gladden the heart of every one interested in the advancement of general knowledge.

Perhaps the opponents of—or shall I say the objectors to?—public libraries may be of the opinion of Sir Anthony Absolute, that "a circulating library in a town is a flagrant tree of diabolical knowledge," or in the matter of a public news-room agree with Burke, that "if a man reads a newspaper regularly for six months he will become a convert to its views"—and consequently come to the conclusion that the knowledge thus gained and the views thus acquired are not to be trusted so far as the long-suffering ratepayer is concerned. Rather let us hope that some day the great parishes and others who oppose the forward movement may come to admit that the nations which possess the most extensive libraries maintain the foremost rank in civilisation.

My object this evening is to place before you, with as full illustrations as possible, something of what has been recently done in library building, so that we may learn what to follow in the future. As Mr. Burgoyne truly says in his admirable little book, "a suitable site lies at the foundation of a satisfactory library building;" and a site to be suitable for the purpose, or for the locality the building is destined to serve, must be central and yet at the same time quiet; it must be ample in area to allow for future extension: as I may have to point out later on, nothing grows so fast as a library. The site must have a good light all round, and, last but not least, it must be dry. In shape it should, if possible, be rectangular; all awkward and angular sites are to be avoided, as, for their size, both costly to build upon and wasteful to work. It must never be forgotten that a library is a public building in every sense of the word; it is usually built by the public and used by the public, and therefore should be in as prominent as well as suitable position as can be obtained. Then as to the building itself. Public libraries are, broadly speaking, of two classes—the purely reference library, such as that at the British Museum or the National Library of Ireland, where the reading-room is the architect's great opportunity for design; and reference and lending libraries (the circulating library of our friend Sir Anthony), combined with reading-rooms for newspapers and magazines. This latter is the truly popular library; everybody reads the papers nowadays, and therefore rooms must be provided where a man may walk in and out when he pleases to peruse any or all of the papers he has a mind to. It is manifest that in a free and open system such as this proper supervision is of the first importance, and the architect's first difficulty in this respect is usually the smallness of the official staff available for such a purpose. Mostly all libraries are understaffed—it is the constant complaint of librarians that they are allowed too few assistants—consequently the arrangements of the plan must be concentrated as much as possible. The officials must be able to supervise at a glance, so to speak, all the rooms to which the public have access. The ideal plan would therefore seem to be that which provides all the public rooms on one floor; but with sites of restricted area or libraries of any size this is not always possible, and therefore the rooms to which most frequent and rapid access is required, such as the news-room and the lending library, with such specialities as boys' rooms, &c., should be placed on the ground floor, leaving the reference-rooms and possibly the magazine-rooms, which are less frequented, to be accommodated on an upper floor. It is essential also that the access to all these rooms should be short, ample, and well lighted.

These remarks sound like truisms to all who have had to do with library building, but it is nevertheless necessary to bear them constantly in mind when judging of the arrangements of plan and their adaptability or otherwise to the fulfilment of their purpose. Then again what may be called the administrative portion of the library, such as the book stores, the librarian's office, and the work-rooms for his staff, must be conveniently placed for the service of the department to which they are more particularly attached. It is not at all necessary that the librarian should see everything, even the entrance hall, from his office—he has something much more important to do with his time than watch people coming and going: the staff must divide this amongst them—but his room can also be used for the periodical meetings of the committee or board responsible for the maintenance and conduct of the library. The storage of books—in the book store as we call it, or the " stack room " of our American friends—is a question of the first consideration, and one on which Mr. Burgoyne will have something important to say—examples of various types are on the screens before you—notably the cleverly designed book stacks of the American libraries, a version of which arrangement is to be found in the National Library of Ireland and in the British Museum.

Of course, much depends on the size and scale of the library itself—whether it may be the central institution with a number of affiliated branches, or one of such branches themselves. The general principle of the planning is the same throughout—simplicity of access and ease of supervision are the keynotes on which the whole system is worked out. The public rooms should be lofty, well lighted, and thoroughly ventilated—more especially so is this the case with news-rooms, and magazine and periodical rooms, which are apt at certain times of the day to become uncomfortably crowded; and I need hardly point out to members of such an institute as this how essential it is that the air in such rooms should be changed amply and often. Any one, for instance, who enters the reading-rooms in one of our large provincial towns or crowded London parishes during its busiest hours will very soon appreciate the necessity of thorough ventilation, especially if the day be one of those warm, moist, muggy horrors we have more than enough of in this interesting climate of ours.

The planning of a public library is not, for all that, a complicated problem. Its requirements are comparatively few and simple, and lend themselves admirably to a stately and architectural system of design from which some striking effects almost necessarily follow. It must be endowed with a fitting dignity both in plan and elevation.

The reading-rooms, which are of no mean size, readily lend themselves to nobility of treatment, and give ample scope for the designer's knowledge of proportion—all such excrescences as fussy little bay windows and other nooks and corners are utterly uncalled for. They may be very picturesque in the dining-room or the drawing-room of a country house, but are quite out of place in a town library. The rooms should possess in themselves that quiet dignity of effect which can only be obtained by good proportion and restraint in design—they should impress one as eminently restful rooms. Any one who has seen the library of the Reform Club by Sir Charles Barry will know exactly what I mean. It is a model reading-room, full of a sense of repose, inviting to study and regretful to leave. " In quietness shall be your strength " was never more true than as a keynote to the designing of reading-rooms for a public library.

The lending library is simply a book store with a large space, and plenty of counter room for the public. More, I think, might often be made of this latter requirement: why cannot it be treated as a hall or lobby by itself, instead of simply a portion cut off the lending library? One side or more could be occupied by the issuing and receiving counters, with a handsome opening between the delivery hall, so to speak, and the book store. This idea has been carried out in some of the American libraries, and more particularly in that at Boston, with great richness of treatment. In the latter the delivery room is 64 feet long by 33 feet wide, and 20 feet high, and is decorated in the most sumptuous manner; its floor is paved with Istrian and Verona marble, its walls are panelled for about 11 feet high with oak, above which, 8 feet in height, are Mr. Edwin Abbey's decorative paintings illustrating the "Quest of the Holy Grail." The ceiling is heavily raftered and painted in colour. The doorways and fireplace are of rich decorative marbles, principally rouge antique and Levanto, the doors themselves being of oak; and to show you that all this gorgeousness of marble and colour does not in any way interfere with the business to which it is dedicated, in 1894 a million and a half of volumes were issued to readers, either for home use or reading in the library. The normal time required to obtain a book is about seven minutes; indeed, the alcove of the delivery room is the busiest spot in the library. The stack room adjoins it, and application slips are sent through pneumatic tubes to all parts of the latter. The books come back to the alcove by means of a little electric railway with low wire basket carriages, and running at the rate of 500 feet per minute.

Considering that the stack room is six low stories in height, and that the delivery alcove is obviously only on the level of one of them, the book railway has to be supplemented by miniature elevators, one for each floor above or below the level of the alcove, and by an ingenious arrangement the railway and the elevators automatically play into each other's hands, with the result that the little carriage is tipped out and rolls into the alcove.

I may mention in passing that there are now over 500,000 volumes in the stack room, and that the annual increase is about 25,000.

Another type of delivery room is that at the Edinburgh Public Library, where the architect tells us the model adopted was that of the telling room of a Scotch bank. The central space is devoted to the public, the counters round three sides, with alcoves behind them, for the storage of 48,000 books. It will be seen from the plans that this arrangement gives scope for and is treated with considerable architectural effect, with the result that the lending library becomes a handsome hall instead of simply a store-room with a portion cut off. It seems to me that an architectural point has here been missed in many of the recent English public libraries.

I have said that no institutions grow so fast as Public Libraries, and one notable direction in which they are growing and are likely to develop still more rapidly in the future is in the provision of rooms for special purposes—such as ladies' rooms, boys' and girls' rooms; studies for special subjects—such as art-lecture rooms, and even class rooms, with probably a gallery for pictures or museum purposes. These are quite independent of the question of providing space for the constantly increasing number of books, so that the library of the future will necessarily cover more space than has been planned for in the past; in fact, the tendency will be for the public library to become more and more the centre of culture and enlightenment of the district in which it is placed, wielding an influence which must ever become wider and stronger. May I plead that the building also, apart from its books, may be of such a character as to assist rather than retard this influence; that the setting may be worthy of the jewels within its walls; that the suburban villa type with its useless turrets and bay windows, to which I have already alluded, may be altogether discarded; that in short, the building in itself may be endowed with that distinction of style and nobility of design which will render it an enjoyment and inspiration to all who hope for the growth of a living interest in architecture as a fine art?

On the principle that a grain of practice is worth an ounce of precept, I am enabled, through the kindness of their architects, to place before you plans and views of some typical public libraries recently carried out in England and America. Among these, to take the smaller libraries first, will be found the library on one floor, as at West Ham; the library on two floors, as at Brixton, Chelsea, and Wolverhampton; and the library on three or more floors, as at Edinburgh—the latter being dictated by the necessities of the site.

In the two-floor libraries the more frequented rooms, such as the news-room and the lending library, are on the ground floor, and the remainder on the first floor. At Edinburgh the question of access has been very cleverly arranged—the lending library is on the ground floor, with the news-room one floor below and the reference library one floor above it. Then of the larger or more important libraries, the plans are shown of the National Library of Ireland, and the Liverpool Library, in both of which the great reading-room is designed with special reference to its importance in an architectural as well as a bibliothecal sense.

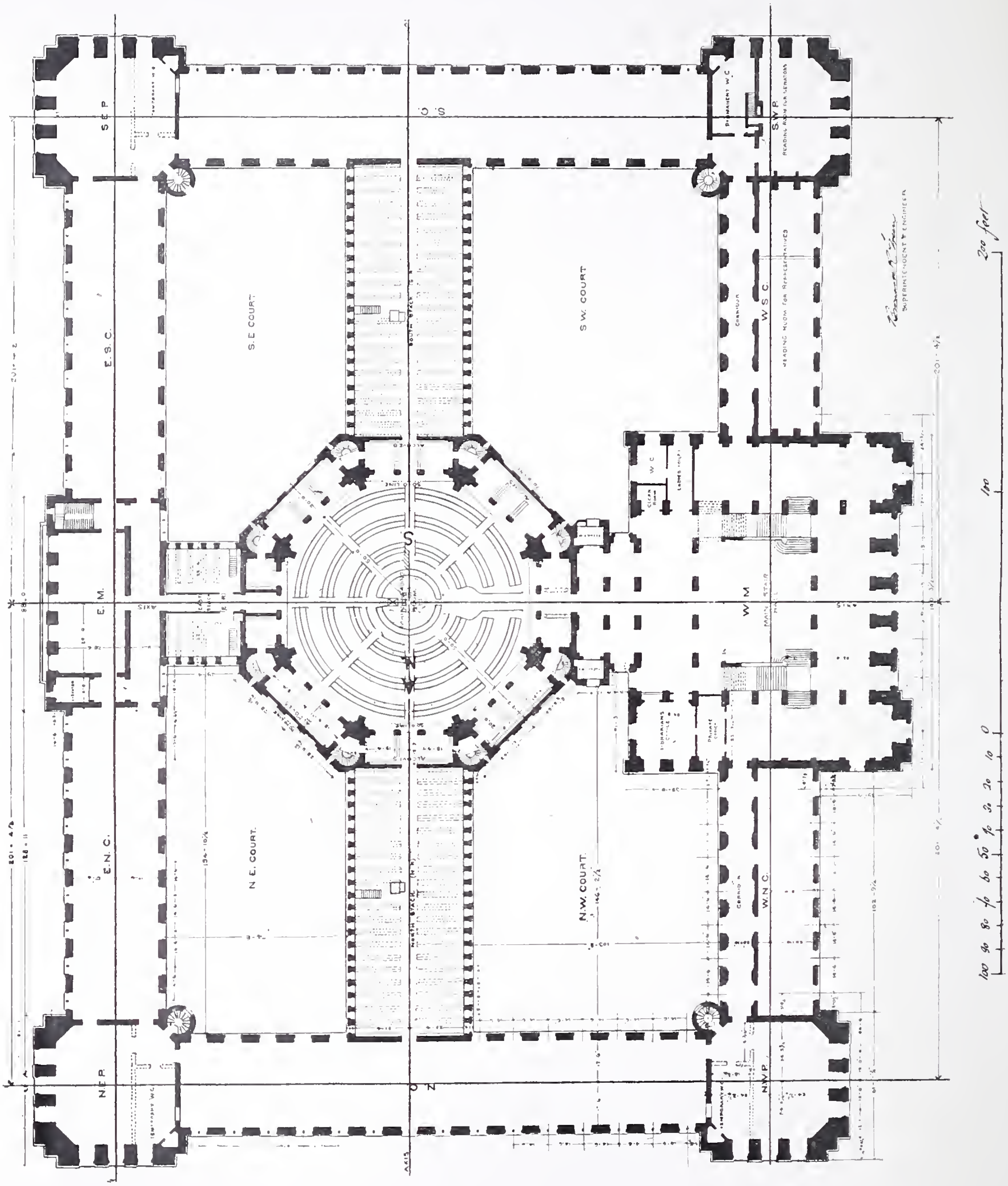
The National Library of Ireland is one of the largest and most complete of our reference libraries recently built. It was designed by Sir Thomas Deane, who had the great advantage of the advice and assistance of its late chief, Mr. William Archer, F.R.S., in planning the general arrangements. These, as well as its architectural treatment, will be understood from the plans and views so kindly lent me by the present librarian, Mr. Thomas Lyster.

If these examples are doubtless all more or less familiar to most of you, I am fortunate this evening, through the great kindness of their designers, or the authorities in charge of the buildings, in being able to place before you illustrations of four of the most important libraries recently built or building in America—viz. the Congressional Library at Washington, the Public Library at Boston, the Columbia University Library, New York, and the Public Library about to be erected in New York.

To take them *seriatim*, let me first direct your attention to the library at Washington, which we are told by the official handbook is "not the mere reference library for the legislative branch of the Government that its name would imply," but "the library of the whole American people, directly serving the interests of the entire country." A truly national library in the fullest sense of the term, and in effect a kind of British Museum and parliamentary library rolled into one.

It was founded in the year 1800. Thomas Jefferson, the then President, called it the "Library of the United States." The first catalogue was issued in April 1802, from which it appears there were then on its shelves, all told, some 964 volumes and nine maps. In 1896 the library contained roughly 755,000 volumes of books, 250,000 pamphlets, 500,000 pieces of music, 25,000 maps, and 256,000 engravings, photographs, and pictorial illustrations in general. In the long history of nearly a hundred years there is one incident to which we, as Britons, cannot look back without a deep regret born of those regretful days. The library was then accommodated in the Capitol, only two wings of which were finished. The British troops entered Washington in August 1814. Admiral Cockburn of the Royal Navy, with a crowd of officers and men, entered the House of Representatives, and seating himself in the Speaker's Chair called the assemblage to order. "Gentlemen," he shouted, "the question is, shall this harbour of Yankee democracy be burned? All in favour of it will say 'Aye;' those against will say 'Nay.' The 'Ayes' have it!" cried the bold Briton. "Light up;" and soon the accumulations of the first dozen years of the library's existence were reduced to ashes, the books being used as kindling for the north wing. That was not the last time it was unfortunately burned; but it was the first and only time it suffered from an act of war.

The library continued in the Capitol till its old quarters became utterly inadequate. The first Act of Congress providing for the new building was passed in April 1886, the



THE LIBRARY OF CONGRESS, WASHINGTON—PLAN OF GROUND FLOOR. (Messrs. Smithmeyer and Pelz, P. J. Pelz, E. P. Casey, architects.)

second in October 1888; operations were begun in March 1889, and completed in February 1897, at a cost of £1,272,000 sterling.

Its architects were first Mr. Smithmeyer, then General Casey, Mr. Bernard Green, C.E., and Mr. Pelz, the latter having been a partner with Mr. Smithmeyer when the original design—greatly modified subsequently—was made.

General Casey had entire charge of the work until his death in March 1896. In 1892 Mr. Pelz's connection with the work ceased, when the building had reached about half its height, and in his place Mr. Edward Casey of New York was appointed "as Architect and also as Adviser and Superviser in matters of Art." His designs principally include all the most important interior architecture and enrichment in relief and colour; and Mr. Casey continued as architect, in conjunction with Mr. Bernard Green, until the completion of the building. The various duties and share in the responsibility both for design and

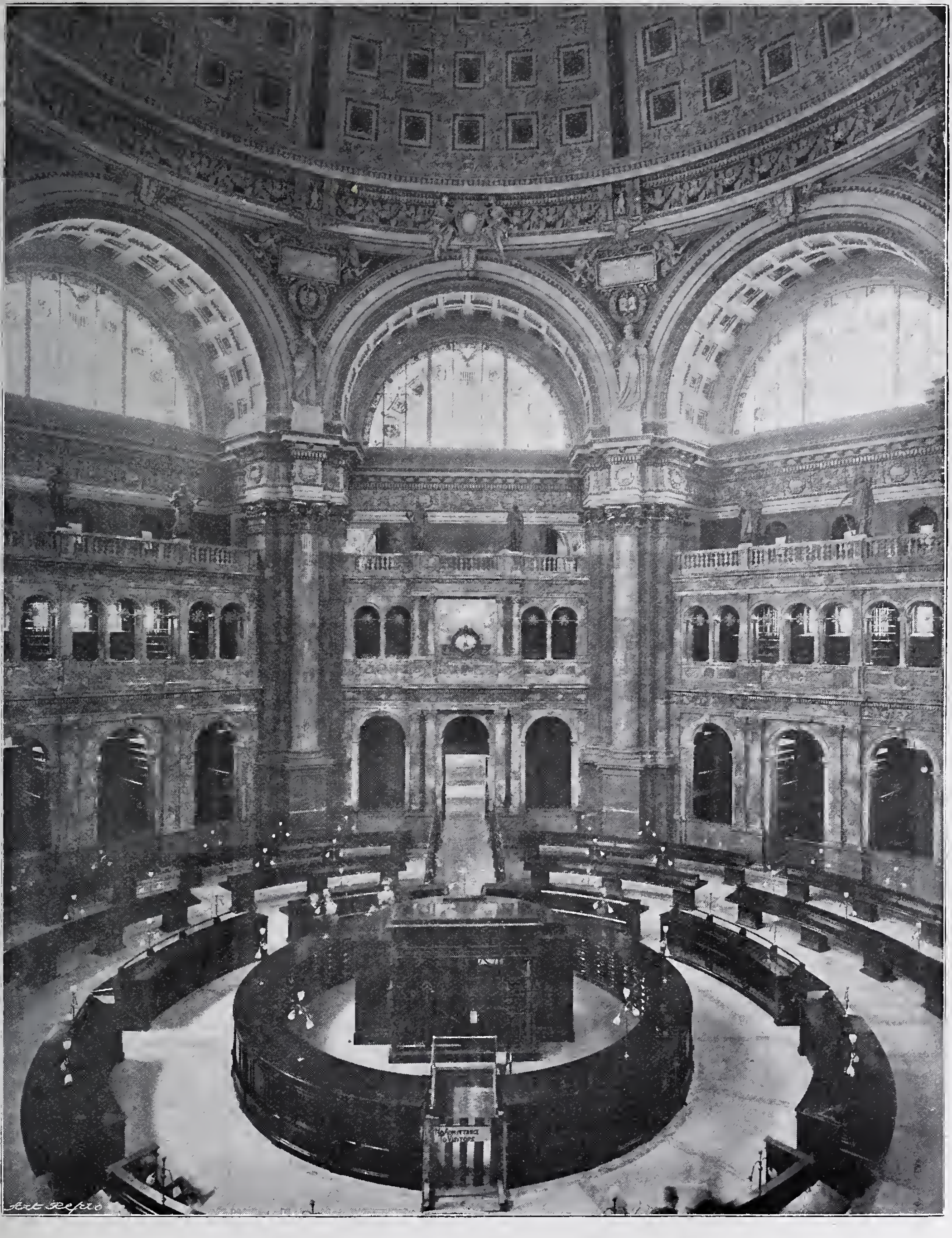
THE LIBRARY OF CONGRESS, WASHINGTON. (Messrs. Smithmeyer and Pelz, P. J. Pelz, E. P. Casey, architects.)

construction of these men seem rather complicated, but in the end we have this great national monument, which, though costing, as you see, a vast sum of money, involving the design and execution of architecture, sculpture, and painting of a very high order, yet nevertheless was completed in six years, and moreover within the limit of time set by Congress in 1888, and within the limit of cost by about £28,000. You will hardly expect me to enter on a detailed account of this building—it would take a Paper to itself. Let me rather quote that, as Mr. Green tells us, "Its design was preceded by few or no good examples of library architecture, and was therefore the outcome of theory and deduction rather than the application of established principles," and that "the effort was to plan on general rather than on particular principles, and afford the largest latitude for expansion and rearrangement in the use of the spaces." Thus far as to its general plan; but what will always be its most remarkable feature is the fact that never before had the American Government itself called upon a representative number—some fifty in all—of American painters and sculptors to help to decorate broadly and thoroughly one of its great public monuments. Their work throughout the building forms the most interesting record possible of the scope and capabilities of American art; not only sumptuousness of design, but richness of materials have been pressed into the service—marble, bronze, mosaic, fresco, and choice woods all bear their part. Let me direct your attention to the two most prominent features in the structure—the staircase hall, and the rotunda or main reading-room; both are a blaze of rich marbles and decoration, and both in colour and relief are marked by a magnificence of architecture above anything else in the building. In the rotunda the columns and pilasters of the piers carrying the dome are of red Numidian marble, resting on pedestals of dark purple Tennessee marble, their capitals being gilded. The screens between the piers are of yellow marble, and the portrait statues which surmount the balustrade are of bronze. The room is lighted by eight lunettes filled with delicately tinted glass.

In general dimensions the building is 468 feet long from north to south, 340 feet deep from east to west, by 72 feet high, and occupies, exclusive of approaches, 3¾ acres. The rotunda is 100 feet diameter, nearly the same as the dome of St. Paul's Cathedral, by 125 feet high to the top of the dome, and 160 feet to the domed ceiling of the lantern. These figures will assist you to realise the scale of the building, and the plans and photographs on the walls give a general idea of its character.

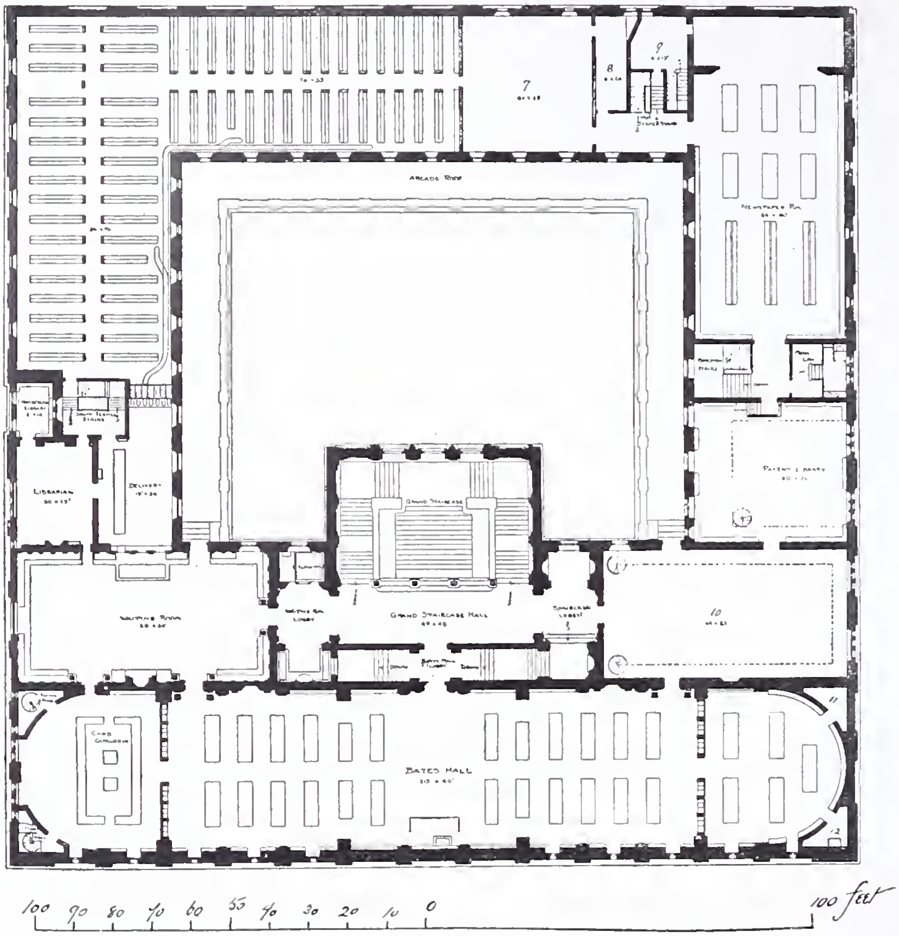
The Government of the United States having set such a noble example, it will not astonish us to find the great cities of the Republic vying with each other in the erection of public libraries. That at Boston is a typical example. Its architects were Messrs McKim, Meade, and White of New York—or, to be perhaps more correct, as this is a public monument, Mr. Charles McKim, the senior member of the firm. As the official handbook has it, he "was the actual architect, designing the building from cellar to roof-tree."

The foundation-stone was laid in November 1888, and it was completed in February 1895, at a total cost, exclusive of the site, of £473,000. The general dimensions are 225 feet long, 227 feet deep, and 70 feet high: the material used is a pink granite from Milford, Mass. The design of the front reminds one of the library of St. Geneviève in Paris, but it is only a very general resemblance. I have already incidentally noticed some of its arrangements in regard to the lending library. The great architectural features of its interior are the Staircase Hall and the Bates Hall—the former notable for the noble series of mural paintings by M. Puvis de Chavannes which adorn its walls. The great painter (alas! now no more) has left it on record that, when commissioned to decorate this staircase, he sought for a main idea for his compositions, and asked himself "What is a public library?" "It is the conservatory of human knowledge," he said, and therefore he must glorify human know-



INTERIOR OF THE ROTUNDA, LIBRARY OF CONGRESS, WASHINGTON. (Messrs. Smithmeyer and Pelz, P. J. Pelz, E. P. Casey, architects.)

ledge. "But in what form ?" he asks again, and the reply was, "Letters and Science; and in each one of these branches I found a multitude of subdivisions." The result is the eight magnificent panels illustrating Philosophy, Astronomy, History, Chemistry, Physics, Pastoral, Dramatic, and Epic Poetry. The staircase corridor is also decorated by M. Puvis de Chavannes, the cost of the whole series being about £10,000.



PUBLIC LIBRARY, BOSTON—PRINCIPAL FLOOR. (Messrs. McKim, Meade, and White, architects.)

The Bates Hall is named in honour of Joshua Bates, who in the early days of the library—it was founded as an institution in 1852 — gave £10,000 to its funds, and £10,000 worth of books.

Here a little link connects the great Boston library with old England, in a much pleasanter manner than Admiral Cockburn's fire at Washington. Mr. Bates, though born in Massachusetts, came early in life to London, and became the head of the great banking house of Baring Bros. in the City. Bates Hall is the reference reading room on the first floor, is 218 feet long, 42 feet wide, and 50 feet high to the crown of its arched ceiling. Its ends are semicircular, with half-domed ceilings. It is lighted by thirteen windows along the east side, and two more at the south end, all set high in the walls. At the north end there are no corresponding windows, but a broad panel instead, which is intended to be filled with a painting by Mr. Jas. McNeill Whistler; along the west wall are ten other panels corresponding to the windows opposite, which are also in time to be decorated by eminent painters.

Along the walls, under the window line, are bookcases for some 6,000 books of general reference, which visitors may freely use as they choose.

Bates Hall has accommodation for 264 readers at 33 tables. At the south end is the card catalogue, and pneumatic tubes connect with the stack room, so that the reader does not need to leave the hall, but simply gives his slips to an attendant, and presently the book comes back.

On the second floor is the valuable collection of books on special subjects. The rooms and corridors in which they are placed are reached through a gallery called "Sargent Hall" after the eminent painter, who has undertaken the decoration of its walls. It is 84 feet long, 23 feet wide, and 26 feet high. The ceiling is vaulted, and the hall is lighted from the roof. The decorative paintings will be entirely by Mr. Sargent; the scheme, illustrating the Triumph of Religion, represents certain stages of Jewish and Christian history. It will be remembered that a section of the decoration now in place was shown at the Royal Academy in 1894. Originally Mr. Sargent was commissioned to decorate the lunettes, the frieze, and a section of the ceiling at each end, at a cost of £3,000; but when this was completed in its place in the hall, so great was the admiration it excited that another £3,000 was immediately raised by public subscriptions to enable Mr. Sargent to unite his work for the ends in a scheme which should comprehend the entire gallery. These paintings, with Puvis de Chavannes' in the staircase, and Mr. Abbey's in the delivery room (for which he also received £3,000), are an earnest of the spirit in which the Bostonians have undertaken and are carrying out their great public library. One of the most charming features of the Boston library is the interior court. It is surrounded on three sides by an open arcade of white marble, similar in design to that of the Cancellaria Palace in Rome. In its centre is a marble fountain set about with well-kept grass-plots; along the walls under the arcade are low oak benches, so that on warm days the court may be used as an open-air reading room.

As will be seen from the illustrations, the whole of this building is a most careful study of modern Renaissance thoughtfully and lovingly carried out, and reflecting the greatest credit on Mr. McKim, its architect, and the public spirit that called it into being. Well may the Bostonians feel proud as they read the inscriptions on its frieze, "Founded through the Munificence and Public Spirit of Citizens." "Built by the People and Dedicated to the Advancement of Learning." No wonder a writer on the "Significance of the Library" feels moved to declare his conviction that "with such an equipment and in such surroundings, supported and revered by a community conspicuous for the high average of the culture of its citizens, facing a future full of the promise of new birth in arts and letters, the public library of the city of Boston has every reason to be sure of fulfilling its most confident hopes."

Not only is Boston endowed with this magnificent central library; but in addition the city is served by a series of branches and stations scattered over the various wards; and it may help you to understand the thoroughness with which this great civic system has been carried out if I give a few figures from the official report for the year ending 31st January 1898.

The area of the city of Boston is 43 square miles, and its population in round numbers 529,000—about the size of Liverpool or Manchester. The central library contained 528,000 volumes.

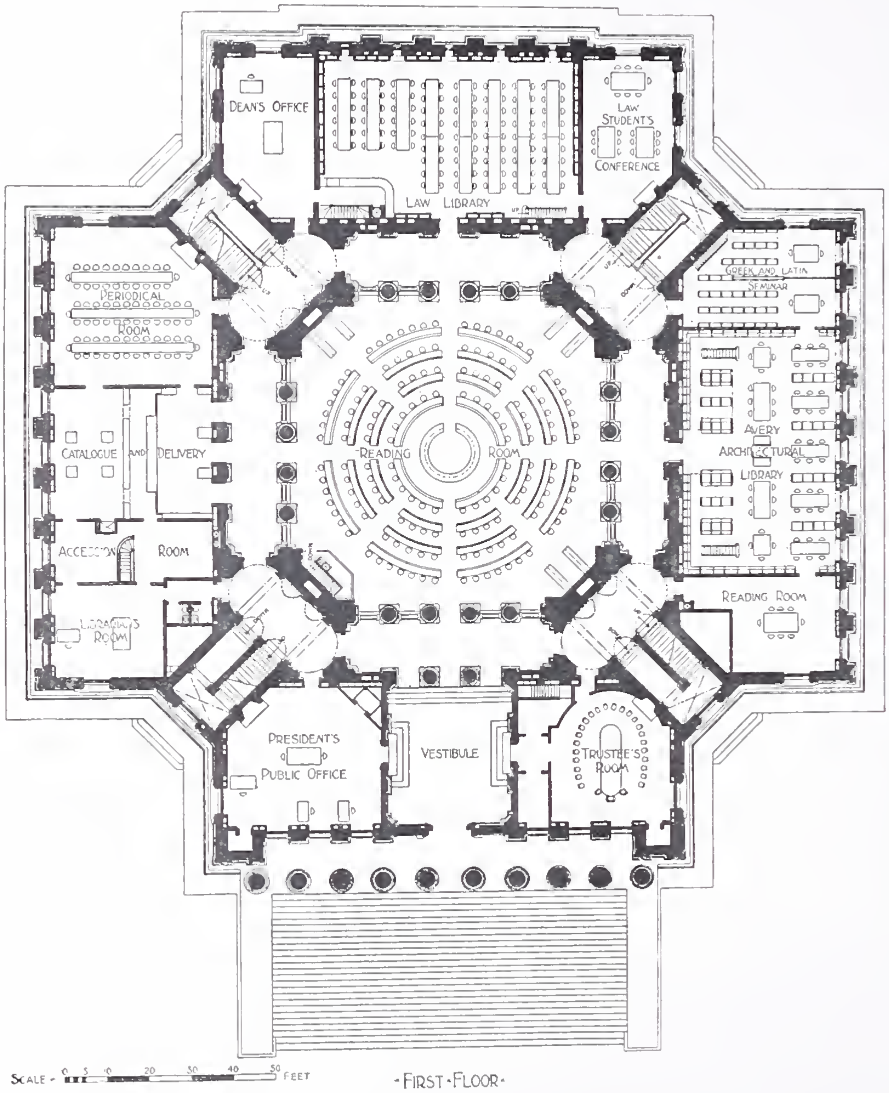
Then there are ten branch libraries, each with an average of 17,000 volumes.

In addition to these there are 17 stations, comprising 4 reading rooms, and 13 delivery stations.

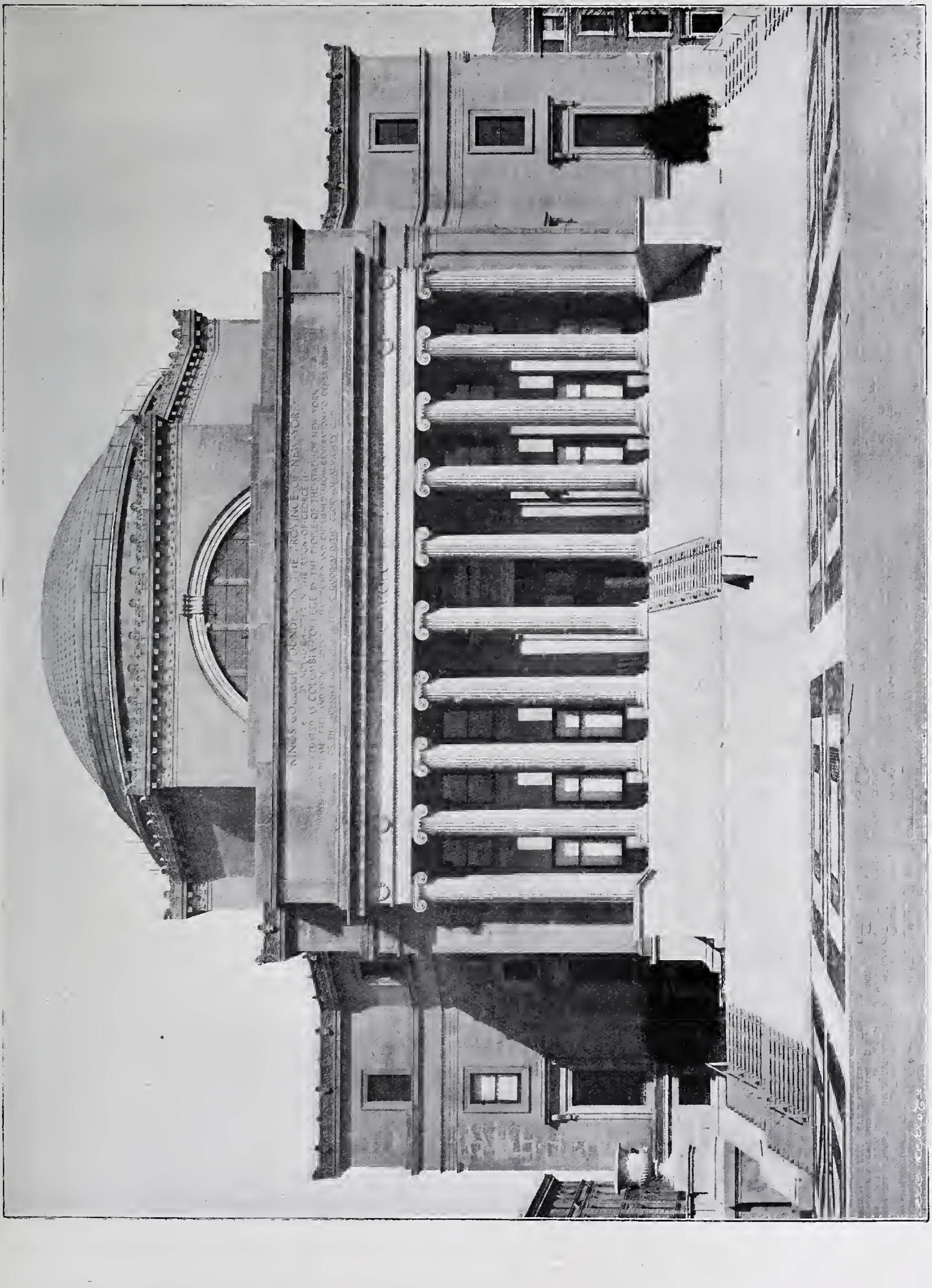
The total additions made during the year reached over 35,000 volumes, and the expenditure on books and periodicals about £8,000.

The cost of maintaining this central library and branches was nearly £52,000, of which £47,000 was supplied from city funds, and the remainder from trust funds, gifts, &c. When one realises that this splendid system began only forty-five years ago with less than 10,000 volumes, it will be understood what it is possible for a civic community to accomplish—more especially when we remember that all this is in addition to other great libraries, such as the Athenæum in the city, and Harvard University in the suburbs—one must admit that it is with some show of reason Boston claims to be the "Hub" of the intellectual universe.

The third American library I have to call your attention to is that of the University of Columbia, New York. As the inscription on its front tells us, Columbia College was originally King's College, and was founded in the province of New York by Royal Charter in the reign of George II. Like many other such institutions, it outgrew its old quarters, and a new site was acquired on Morningside Heights, and there, for some years past, the rebuilding of the University has been going on. The general view and the key plan show that the library is the most conspicuous object in the group of building as yet erected. It was built by Mr. Seth Low, the President of the University, as a free gift, as a memorial of his father, and has cost for construction and equipment nearly £240,000. The architects are Messrs. McKim, Meade, and White, and the large plans and views so kindly lent by them show very completely the architectural character of the building. In plan it is like a Greek cross, with the great reading room at the intersection of the arms, and covered by a dome. It is more severely classic in style than the Boston Library. Nothing could be finer than the manner in which it is placed on the ground, with its magnificent approach of great terraces, and steps leading up to its noble entrance portico of ten Greek Ionic columns. Passing through the entrance hall, adorned with splendid marble columns, the visitor at once enters the great reading room.



COLUMBIA UNIVERSITY LIBRARY, NEW YORK. (Messrs. McKim, Meade, and White, architects.)



COLUMBIA UNIVERSITY LIBRARY, NEW YORK. (Messrs. McKim, Meade, and White, architects.)

It is 75 feet square on plan, with octagonal angles, and is lighted by huge lunettes in each arm of the cross. Though not so large or so elaborate in treatment as the rotunda of the Washington Library, it is in some respects finer in design and more impressive in its simplicity. The columns are Greek Ionic throughout, and all the detail is marked by refinement rather than richness.

The tables in the reading room are arranged in concentric circles, as in the Washington Library, with this exception, that the centre of the circle is occupied by a polygonal bookcase, and books are stacked around between the columns.

The building, besides being used as a general library, is also the laboratory, so to speak, of those faculties whose implements of work are books alone. Thus the north arm of the cross is given up to the law school; on the main floor is the law reading room, with the law book store below it. On either side are rooms for the offices of the school, the professors' rooms, and rooms for the law clubs; similarly, the faculty of political science is located in the western arm of the building, and the faculty of philosophy in the eastern arm. On the upper floors are lecture and class rooms for these faculties. The aim has been to make the use of the books as easy and convenient as possible, alike for professor and student, the library being not only a storehouse for books, but also a laboratory for those who use them, quite as much thought having been given to the reader as to the book. The Avery Architectural Library, a very fine collection, is in the eastern arm, so that at Columbia we may perhaps conclude that architecture is not only a profession and an art, but also a philosophy, seeing it is located with that faculty.

The building may be taken as an example of a typical university library worked out on modern lines to suit modern requirements, and no effort seems to have been spared to make it as perfect as possible for the work to be done within its walls, a utilitarian scheme artistically carried out.

The public library about to be built in New York is the latest of the series. It was the subject of a limited competition last year, and copies of the successful design, kindly sent me by the architects, Messrs. Carrère and Hastings, are on the screens. In this competition the competitors were supplied with a plan prepared by the library authorities, and which had to be followed in all essential particulars; it had been studied with great care, and was a very good scheme, and I understand the successful design does not greatly depart from this official plan. In its main lines it somewhat resembles, with significant differences, the Boston library; but in the instructions was this distinction among others, though the authorities did not object to external splendour, they rather elaborately took up a position in favour of a simple interior, evidently under the impression that with the examples of Boston and Washington before their eyes the competitors would let the project run away with them and sacrifice utility to splendour.

Be that as it may, the winning design, as you will see, has certainly resulted in a good plan, and what promises to be a stately, dignified exterior.

In the first place it will be noticed that the raising of the building on a great terrace is, as at Washington and Columbia, and partially at Boston, again a marked feature of the design. Here it is worked out with greater elaboration of the surroundings, like a formal garden around a house, till site and building become blended in one harmonious whole. It is evident the architects were not content with designing the building alone—it must be provided with a dignified setting; so by means of broad flights of steps, terraces, fountains, and votive columns, the approaches are made to contribute to and enhance the effect of the architectural picture. It seems to me, this is a point to which far too little attention is paid amongst ourselves. Our public buildings are more often than not brought up to the building line, with probably a sunk area as well, so that the structure seems to rise out of a hole—in one instance, the Natural History Museum at Kensington, it is actually set in one. Yet look at the advantages gained when the building is raised from such a terrace as at Columbia University, or that proposed for the New York Library. Surely it is not enough that the buildings themselves be suitably designed, while their surroundings are left to take their chance. Surely, having got a great architectural work, it is worth some little sacrifice of ground to approach it properly.

It will be noticed that the New York Library promises an improvement on that at Boston, inasmuch as the delivery room of the lending library is on the ground floor, and has a separate entrance to itself. The stack room is one huge block extending nearly the whole length across the building, and is everywhere in communication with the numerous reading rooms—special and otherwise. The architectural treatment of this great stack-room is worthy of attention; here it is brought boldly to the front, instead of being concealed by courts, as at the Washington Library, and is treated in accordance with its importance in the general scheme.

The staircase hall is again a magnificent effort, monumental in its effect. It is to be hoped the desire of the authorities for a "simple interior" will not in its turn run away with them here, but that painting and sculpture will be allowed to contribute to the decoration of this fine hall. The plans themselves explain the general arrangements.

The elevations show the influence of the French school in which the architects were, I understand, brought up; they are not over-elaborated with features, but treated with a broad simple dignity which promises well for the ultimate result. The interior is more freely treated in spite of the request for simplicity, but as Messrs. Carrère and Hastings are noted among American architects for the purity and classicality of their detail, as well as their strong sense of proportion, they may be safely trusted to make this new library not the least architecturally notable among a very notable group of buildings.

Gentlemen, I fear I may have occupied so much of the evening that you will hardly thank me for leaving so little for the important matters of administrative detail on which Mr. Burgoyne has to address you, but I trust the comprehensiveness of the subject may be some excuse, and particularly since it gave me the opportunity of bringing before you what others are doing besides ourselves. I venture to hope these American works are not without their lessons for us in more senses than one, and not only as libraries, but as public buildings *per se*. Here we are in the most opulent city in the world, under an ancient Corporation and an ambitious County Council, in the midst of parishes as large and some of them as wealthy as many well-known cities. We are in a country abounding with great municipalities, rich in tradition and active in all honourable enterprise; and yet do not these libraries, built, as the inscription at Boston tells us, under the conviction that "The commonwealth requires the education of the people as the safeguard of order and liberty," give us pause; and these public buildings, "founded through the munificence and public spirit of citizens" of no mean cities, speak to us in tones the significance of which cannot be mistaken? Are we above taking lessons from our vigorous offspring in the West? If not, would that some of the public spirit and the love of art which animate the founders and designers of such works as these could by some occult process be transferred to the hearts of the City Fathers of London and our great provincial towns! What might there not be accomplished for the arts and letters of our country! If the brilliant examples set by New England could but stir the ambition of Old England to go and do likewise, one might be tempted in the matter of public libraries and other cognate structures to join in the conclusion of the writer I have already quoted, when he says:—

"What the present has been to the humble beginnings of half a century ago, so shall the end of the next fifty years see an institution so robust, so progressive, so powerful in influence, that its possibilities can be prefigured only in the mind of the veriest dreamer of to-day."

II.—PLANNING AND FITTING. By F. J. Burgoyne.

In considering the design of a suitable building for a municipal public library, it is important to remember that the income of the library is limited to the proceeds of a rate of one penny in the pound, on the rateable value of the district concerned. There are, however, a few exceptions to this rule. Some half-dozen towns have obtained parliamentary powers to levy a higher rate, but in only one case (Wigan) does it reach twopence, and speaking generally, three-halfpence in the pound may be said to be the outside limit. *Per contra*, a few districts and towns have not levied the full penny, but are content with a halfpenny or three-farthing rate. Amongst these may be mentioned the London parishes of Kensington, St. George's Hanover Square, Hammersmith, and Shoreditch; and country towns like Portsmouth, Ashton, and Rochdale. The proceeds of the rate vary in amount from about £19,000 per annum in Manchester to £15 in Drumoak, a little Scotch village which characteristically considers a halfpenny rate sufficient for its needs.

My reason for mentioning the limited income of the library is that in this respect it is different from nearly all other municipal institutions. If you are called upon to design a workhouse, a town hall, or a fever hospital, the amount to be spent upon the building can be settled without considering whether it can be raised by a given rate. A building to fulfil certain requirements is needed, and your instructions will be to design such a building, at a cost not to exceed a stated sum. With the library it is different, and you should have some idea of the probable income before designing, so that too great a proportion of it shall not be expended in interest and repayment of loans for site, building, and furniture. There are many instances of libraries crippled in their work, through ways and means not having been sufficiently considered at their inception. I may mention one case in illustration of my point. The parish of St. Mary, Newington, borrowed for its building and site the sum of £16,900. The income from the penny rate at the time was about £1,750, and the yearly payment for interest and part principal amounted to £1,140, leaving a balance of but £610 to work the institution, for payment of salaries, and to provide new books, newspapers, and binding. I think you will agree with me when I express the opinion that the initial charges for buildings and sites should be paid out of the general rates, and that the whole proceeds of the penny rate ought to be available for the current work of the library.

It may be said that a consideration of the libraries finance has but little to do with the architect, as he is not responsible for the working of the library, and his interest ceases with the completion of the building; but I am sure it will be conceded that the plan of the building should be considered, not only in relation to the public, but also to the probable size of the staff which the income will allow to be engaged, to run the place.

For the purposes of my paper I will roughly divide municipal libraries into three kinds: small, medium, and large. Let us first consider the minimum accommodation which a small library may reasonably be expected to provide. It should have a place for the reading of newspapers and periodicals, and a lending department for the loan of books for home reading. The staff of such a library will probably consist of a librarian and a lad. The librarian's duties will be multifarious. He will in turn be caretaker, librarian, stoker, and on occasion, "chucker out." It is absolutely necessary, therefore, that his usual position should be some-place where he can readily supervise the whole of the building. The spot which experience has proved to be the best is the issue desk or the counter of the lending department. The plan generally adopted for such a building is a rectangular room, lit chiefly from the top. The newspaper stands and tables are in the centre. The walls on one, two, or three sides are shelved for books—often to a height of fifteen to eighteen feet—and a counter or rail runs around the room at a distance of six or eight feet from the books.

My objections to this type of building may be briefly summarised. The noise incident to the work of the lending department disturbs the attention of the readers at the newspaper stands and tables, and the librarian, who is often on duty for ten hours daily, has to breathe the vitiated air, respired by the not always too clean frequenters of the news-room. The lending department in most small places is closed one afternoon, or one day per week, and it is impossible to secure the books during the temporary absence of the person in charge.

The Pretoria Library, which occupies an area of some seventy by fifty feet, is arranged somewhat differently. The entrance is at one side, and the lending department is separated by glass screens from the news-room, so that it may be locked up. There are separate rooms for the magazines and for the study of the books of reference. The supervision from the lending library through the glass screens is perfect, and the librarian can without trouble visit any part of the building.

Let us now turn our attention to buildings of the second class, which I have designated "medium," and are such as would be expected in towns or parishes of about fifty thousand inhabitants. Here the staff will be somewhat larger, and the police duty which fell upon the librarian of the smaller library will generally be transferred to a porter on duty in uniform during the busiest hours of the day, and so the necessity for supervision of the whole building by one person from one point is not quite so pressing.

The public accommodation provided will be increased by the provision of books of reference for reading upon the premises, and these require a quiet room for their study. This is generally obtained by providing a room for the dual purpose of reading the higher class magazines and reviews, and works of reference. If the public rooms are all on one floor, the reference books will be shelved alongside those forming the lending department. If on two floors, the reference department should be placed upstairs, and the lending and general news-room on the ground floor.

This is again the minimum accommodation, but many libraries provide rooms for other purposes, such as separate reading-rooms for women and for children, a lecture-hall, and a museum and art gallery. All of these are laudable and useful, provided the income of the institution is sufficiently large for its proper upkeep; but it seems to me the height of folly to attempt more work than can be efficiently performed with the limited rate available. Better far is it to do the legitimate library work well than to starve it by wasting money on lectures by local gasbags on subjects such as "My Summer Holidays in Devon," or "Our Local Poets and their Works;" or providing a museum in which we see such specimens as "an extraordinary stone, weighing $2\frac{3}{4}$lb., taken from his worship the Mayor's horse 'Sandy';" or an art gallery whose chief attractions are a series of portraits of aldermen and town councillors, in cocked hats and violet gowns, painted by local artists.*

The third class—the larger municipal libraries—suitable for towns of 150,000 inhabitants and upwards, I will not say much about, as Mr. Brydon has described to you some buildings of that type. I may say, however, that in these larger towns, the work done in the reference department is of the most valuable character, and it is advisable to have, in addition to the ordinary reference reading-room, a smaller room for the use of students of special subjects, or those who are engaged upon original research. For instance, in my own library I have had to accommodate readers who have brought collections of shells and of lepidoptera to our reference library, in order to name them; and a student of microscopy, who brought his instruments for the purpose of comparing certain bacteria of his own breeding with those figured in the *Journal of the Royal Microscopical Society*.

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* Of libraries of small and medium size, plans of the following were shown: The Wandsworth Library, designed by Mr. H. Branch; the Croydon Library, designed by Mr. C. Henman; the Victoria Institute, Worcester, designed by Messrs. Simpson and Allen; the West Ham Central Library, designed by Messrs. Gibson and Russell; the Edward Pease Library, Darlington, designed by Mr. Gordon Hoskings; the Tate Public Library at Streatham and the Tate Central Library at Brixton, both from Mr. S. R. J. Smith's designs; the new Library at Westminster, designed by Mr. F. J. Smith; the Sale Public Library, designed by Mr. R. J. McBeath, and the Bootle Library.

I have so far spoken entirely about the rooms used by the public, but the working side of the library also requires your careful consideration. The librarian will require a room for his own use, which in the smaller libraries should be adjoining the lending department. In the larger buildings his office will be better situated in conjunction with the reference department. It should be of considerable size, for in many cases it will be used also for the monthly meetings of his committee. It is by no means necessary that the public should have direct access to it; if they have, he will be worried about trivial matters, such as "There is a boy in the news-room eating nuts," which could easily be dealt with by one of his subordinates. Generally the room will be shelved for the reception of books on bibliography, catalogues, and the other working tools of the librarian. In large libraries there should be a fireproof strong-room, on the same floor as the reference department, in which the rarer books and manuscripts can be stored, and rooms for repairs and binding on the premises. Mess-rooms for the staff are necessary, and if the employees are of both sexes, suitable lavatory arrangements for each. In most of the London libraries a residence for the librarian is included in the building. This is economical, as the cost to the committee of such an addition is less than the value of it to the librarian—or, in other words, the extra salary which would have to be paid to the officer, if his residence were not provided, would be more than the interest on the extra cost of the building. One thing, however, should be guarded against. The house portion should not have direct communication with the library. If it has, the taxing authorities, who have no regard for your limited income, will charge the library with inhabited house duty upon the whole value of the building, instead of upon the house portion only.

Before planning a building, a clear idea of the method of work to be employed should be obtained from the librarian. In lending-library work, for instance, there are three methods of issue, viz. with an indicator, without an indicator, and "open access," or allowing the readers to go to the shelves and select their books. In each case the arrangement of the room and the space required are different. If an indicator is used, a counter not more than 2 feet 9 inches in height must be provided, with a good light on both sides of it. The indicator in most general use is the "Cotgreave," and it takes fifteen inches for the display of each 1,000 numbers. The counter must be long enough to take indicators for future additions, as well as show-cases with glass fronts for the display of the newer books. In large libraries it is best to break the indicators up into blocks of 3,000 and separate them by a show case or issue desk, so as to distribute the persons consulting it. Where no indicator is used, and the librarian takes each reader's list and looks for the books, a different height of counter is advisable. For the "open access" system a central enclosure for the librarian is necessary, with inlet gate at one side and outlet at the other. The shelving must be at a minimum distance apart of five feet, and none of it higher than can be reached by a person of short stature.

A very general fault in lending libraries is the inadequacy of the space for the public. In my own library the counter is 52 feet long, and the readers' space is 352 square feet. This is not sufficient. From actual count I find that on Saturday night, between 6.30 and 8.30, our busiest time, we often have an issue of 600 volumes, and I have counted 212 persons in at one time. With the open-access system much the same experience is recorded. The librarian at Croydon estimates that the number of persons served on a Saturday night between 7 and 9 is about 350; when busy there will be 60 to 70 people in the library at a given time, and when busiest about 100.

In shelving the books in the lending department it is of the utmost importance to place them as near to the issue desk as possible, in order that quickness of issue may be facilitated. Remember that if the shelving is only three feet further away from the issue desk than necessary, and 1,000 volumes are issued in a day, the assistants have to walk 6,000 feet, or over a mile, more than they need do. In the larger libraries the growth of the stock of the lending department will not be so great as in the reference department, and so less room is required for future additions. This is in consequence of the greater wear and tear of the lending-library books, and of the ephemeral character of many of them. At the present time there are many lady novelists, of each of whose works a library might buy 100 copies and still not satisfy the demand. In a dozen years their vogue will have departed, and their place be filled by others. In the Tate Central Library I find that I have withdrawn 2,500 volumes in six years, from an average stock of 13,000, and in future years this proportion will increase. It is hardly necessary in any but the largest libraries to provide room for more than 25,000 volumes in the lending department.

The shelving of the reference books also requires consideration. In some places it will be desired to have the books in the same room as the reader, as in the Guildhall Library. In others it will be thought best to shelve the bulk of them in a store-room, adjacent to the reading-room. My own predilections are for the latter course. In any case considerable room must be allowed for the growth in this department, a moderate calculation being that in the larger libraries the stock will increase threefold in twenty-one years. How to cope with this enormous accretion is a question deserving careful attention. It seems to me that the adoption of the American "stack system" of packing the books, combined with rolling bookcases for the works in least demand, is the ultimate solution of the problem. This system of stacking, or rather warehousing, the books consists of a series of bookcases with shelving on both sides, arranged at a minimum distance of three feet from each other. The cases are about seven feet in height, and generally have a hammered glass or open-ironwork floor. Another tier of similar cases is superimposed, and another on top of that one. In the new library building at the Capitol, Washington, where ample side light is obtainable, nine floors, each seven feet in height, are built. If top light only is available, two, or at the most three, floors only can be used, but with electric lighting of each tier, or good side lights, a larger number. The floor of the reading-room should, if possible, be arranged to be placed about the level of the centre floor of the stack, so that the attendants will have a minimum number of stairs to ascend or descend. Fig. 1 is a section through half of the

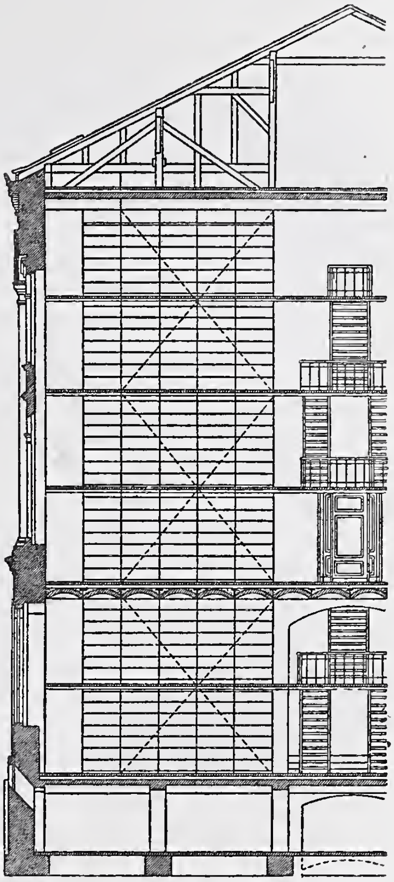
FIG. 1.

stack-room of the University Library at Grieswald. You will note that the stack is six tiers in height, and that the reading-room floor is placed between the second and third from the bottom. A sub-basement is underneath for dryness, and the communicating stairs are in the centre of the stack lit by a skylight. There is no skylight over the books, for fear of damage by rain leaking through. The stack-room of the University Library at Halle is four tiers in height, and lit entirely by side windows, 3 metres wide, with wall space between each of $1\frac{1}{2}$ metre.

The Imperial Library at Strassburg furnishes a typical illustration of the general arrangement of a large library built upon this system. The reading-room occupies the centre of the building, and is surrounded by the large stack-rooms on three sides; these are connected by three shorter rooms arranged in the fashion of a Greek cross, with courts for light between the arms. The great stacks are eight tiers in height, and the connecting arms five. The front of the building is used for the official and the administrative work of the library. The shelf capacity of the building is about a million volumes, and the present stock 700,000.

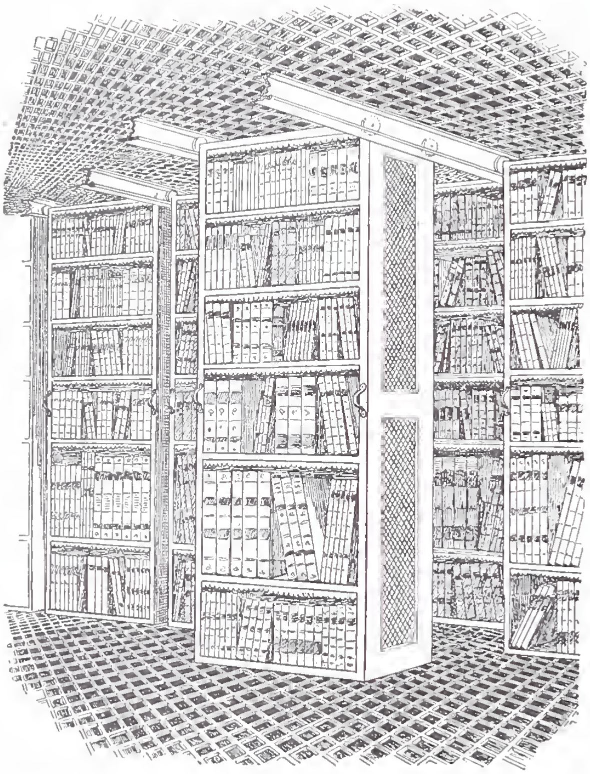
FIG. 2.

The stack-rooms at the British Museum will no doubt be well known to you, but I would like to call your attention to a new system of sliding presses in use therein. The stacks are three tiers in height and an average of about nine feet apart. In front of each bookcase a couple of steel girders with flanges are bolted to the iron floor above, at a distance of about thirty-six inches from each other, and at right angles to the case. From these girders hangs a bookcase of the same width, to within a few inches of the floor. It can be filled with books, and is readily pulled away from its normal position, which is close against the front of the fixed bookcase. The weight of hanging case when full of books averages about 10 cwt. A valuable feature of this invention is that it can be adopted piecemeal, as the necessity arises for greater accommodation in any particular section of the library. Fig. 2 is a drawing of the sliding press.

A somewhat similar system, invented by Mr. W. Lambert, and manufactured by Messrs. Lucy and Co., of Oxford, has been adopted in the newly rearranged library of the India Office. The iron bookcases hang from girders as at the British Museum, but they are packed close together, and if a book is wanted the case containing it is pulled out into the central gangway, which is of the same width as the sliding case. This is the closest method of shelving a large number of books that I know of, and will be very useful in libraries where the books are not much in use, and require to be warehoused rather than displayed. The cases average 3 feet 6 inches in length, and 8 feet 8 inches high. They have eight shelves on either side, and will carry 600 ordinary octavo volumes. The weight of the case when empty is about 3½ cwt., and if filled with books about 1,300 lb.

Whatever system of shelving is adopted, it is important to make all the shelves of the same length. Experience has shown that thirty-six inches is the most suitable. No bookcase should be higher than eight feet, and seven feet is preferable. With the latter height it is possible to reach a book from the top shelf without the use of a ladder or stool.

In bringing this somewhat discursive paper to a close, I am conscious of having left out many things that would have been of interest to hear discussed. There is, for instance, the great question of how to ventilate without a draught, which I fear would take an evening of itself to properly consider. The most suitable kind of decoration for the interior of a library is another question of interest, and would open up a large field of profitable discussion.

In conclusion, I thank you for the opportunity of addressing you upon a subject of so much interest to myself.

DISCUSSION OF THE FOREGOING PAPERS.

Professor Aitchison, R.A., *President*, in the Chair.

Mr. F. PACY (Hon. Secretary of the Library Association) thought that librarians might congratulate themselves if architects could be induced to see that there was a field for the exercise of the highest part of their art in connection with libraries. Nothing could be more fatal to the success of a public library than to neglect its attractiveness to those privileged to use it. If the library were a shabby, ill-constructed building, in an out-of-the-way place, it was almost certain to be a failure; if, on the other hand, the building were well constructed, and had bright, cheerful, and well-ventilated rooms, its prospects of success and usefulness would at the outset be assured. It had been pointed out that the ideal position was to have all the departments on the ground floor; but that was not always obtainable. On the question of the storage of books he did not agree with Mr. Burgoyne that it was better to have a storage room apart from the reading-room. His feeling as a librarian—and he thought he should have the sympathies of all who used libraries as such—was to show the treasures that the library possessed round the walls of the room—and, with all deference to great painters and sculptors, there was, he thought, no better furniture for a library than books; there was nothing that gave a greater air of comfort or attractiveness, or that led so much to the feeling referred to by Mr. Brydon, that one remained there with pleasure and left with regret. Mr. Brydon had touched on many points, but there was one thing that had not been mentioned which it had often struck him that architects might give attention to. In the warming of the buildings by hot water or by steam, radiators and pipes were almost invariably placed against the walls. But one did not get the warmth—radiators and pipes were covered over with bookshelves, and the dirt penetrated the shelves and disfigured and deteriorated the books. If architects placed the warming arrangements in the centre of the rooms it would be a great gain, and would remove a blot which marred many of the libraries in this country. The supervision of the library was of course a very important point; but the idea that the librarian and his staff must be in the centre of everything and see all that was going on around was often carried out to their great disadvantage from a health point of view, by reason of the vitiated atmosphere they were compelled to breathe. With regard to the decoration of the buildings, he thought that in their smoke-laden atmosphere more might be done in the use of tiles or marble or washable materials; they would thus avoid the necessity for the constant closing of these institutions for periodical cleaning and redecoration. Much inconvenience, expense, and annoyance would be saved by this means. He had listened to Mr. Brydon's paper with the greatest pleasure. He had seen some of the drawings and plans and photographs of the American libraries for the first time, although he had had the privilege last year, in common with some of his brother librarians, of hearing Dr. Billings, the Director of the New York Library, give his ideas of the working of a splendid plan of library arrangement. He sympathised with Mr. Brydon's peroration. It was a remarkable thing that this country, which had a literature as old as its history, should have so neglected those palaces, as they ought to be, of learning, of which such splendid examples existed on the other side of the Atlantic, where their literature was comparatively new. No doubt the American millionaires had largely aided their fellow-countrymen in this matter; and if the wealthy people here would come forward in the same manner, no better field existed for their liberality than the establishment of libraries for the public good, which would, moreover, encourage two professions, that of the architect and that of the librarian.

Mr. J. H. QUINN (Librarian of the Public Libraries, Chelsea) said that if he could get the architects quietly in a corner he should advise them to take care to add to the bill for extras. In Chelsea the Library had been up so long that there was no harm in confessing now that they had scamped the work too much, and cut Mr. Brydon down in his plans, and also in his elevation, to such an extent that they now found to their cost that they already wanted the room then cut out. The committee had not finished with Mr. Brydon twelve months before they had cause to regret that they had cut him down so much. It did not fall to the lot of a parish or a municipality to build a library every year, and it was a great mistake for the authorities to scamp the work and cut down their buildings, as they so often did. He differed from Mr. Burgoyne as to the rate at which books grew in libraries. They were enabled to weed their stock a little, but not so much as they could wish; because a book that was withdrawn one day was sure to be asked for the next. In Chelsea, whereas in 1891 they had 10,000 books, they now had 27,000. At that rate they would soon have filled Mr. Brydon's building. Happily they had some spare ground at the back, and he hoped Mr. Brydon would be living when the time came to build an extension. The selection of the site was a very important question, but one which did not always fall to the architect—it was more a matter for the Library authorities; but it was very necessary to keep some room for extension.

Mr. H. HEATHCOTE STATHAM [*F.*] said he should like to propose a vote of thanks to Mr. Brydon and Mr. Burgoyne for their very interesting Papers. Mr. Brydon had cheered their spirits by bringing before them various examples from America of how libraries may afford scope for not only useful but beautiful architecture; and Mr. Burgoyne had shown them that the business of a librarian did not deaden the sense of humour. Mr. Brydon had mentioned a library in which all the windows were closed and air-tight, so as to prevent the entrance of dust; and he said that of course the ventilation was supplied by other means. But if the windows were closed to prevent dust coming in through the natural air, what was to prevent its coming in through the ventilators? and if the air were forced through a number of tubes which were difficult to get at, it seemed extremely probable that more dust would get in in that way than through the ordinary windows. With regard to the Liverpool Library, that, he was afraid, was one example where architectural considerations took the place of utilitarian considerations. The circular library was built partly as a monument to Sir James Picton, and it was a very ingenious way of connecting two buildings which were already built placed at different angles; the circle between, with its colonnade round, forming a happy architectural group; but they found when it was built that almost every whisper could be heard in the room. That would not necessarily be the case if the scale were larger, because in the British Museum Reading Room, although a good deal of talking went on there which should not, he did not know that it echoed at all. But he had been assured that it was a most serious drawback to the circular reading-room at Liverpool; and that was a point to remember, that it was almost impossible to avoid hearing every sound in the room. One matter for consideration was as to the materials to be used for reading-rooms. Generally the floor was laid with something to prevent the noise of the feet; but that made it difficult to keep the room clean. It would be almost better to lay down merely strips of material to walk upon which could be easily taken up, and the floor regularly washed. A friend of his had remarked on the size of the "Reading Room flea" at the British Museum. This, he suggested, might be kept out altogether if there were a washable floor. A very ingenious suggestion had been made by a member of the Institute, Mr. W. M. Fawcett, many years ago, and there was an illustration of it in the *Athenæum*, a paper which did not generally give illustrations. It was a proposition for a library that could be increased *ad infinitum*. The idea was to commence simply with a circle, which was to be added to in a spiral, with cross doors connecting the galleries, so that as the books increased one could go on building the spiral for ever. He believed nothing was ever done with it practically, but it struck him as an exceedingly ingenious idea for the indefinite extension of a library.

Mr. BERESFORD PITE [*F.*], seconding the vote of thanks, referred to the Rylands Library at Manchester, which he had recently seen; it was certainly the most elaborate and costly building of this sort that had ever been erected in England. It rather baffled description; it was so entirely unexpected, one might also say so entirely exotic—a gorgeous fifteenth-century vaulted hall covered with elaborate tracery, deep bays vaulted in stone, with elaborate traceried windows, traceried corridors, the minimum of daylight, and the external air absolutely excluded. Mr. Basil Champneys some time ago, at a meeting of the Architectural Association Class of Design on the subject of Libraries, explained the system by which the external air was excluded, it being admitted only through a ventilating trunk, in which it was washed, fanned, purified, and cleaned before it was allowed to come near the interior of the building. This would probably explain the point referred to by Mr. Statham; the system of ventilation was on the same principle as that in operation at the House of Commons. There seemed to be a difference required between the architectural treatment of the modern stuffing machine (this reading by the assistance of a penny rate), and the comfortable homelike charm one liked to associate with the reading of a good book even in one's own study or library, or in the library hall of a college—the two ideas must be dealt with in a different way. The practical suggestion made by one of their librarian visitors as to the use of glazed or other impermeable material quite agreed with that idea. As to ornament and decoration, in crowded and stuffy rooms in which people devoted their attention to books, and books only, one was little inclined to embark on architectural fancies. But a librarian who was willing to confine his decorative wants to books confined it to about 7 feet 9 inches above the floor, and the space above that must be left to whitewash and imagination. The hall and the staircase and the external elevation were the only parts available to the architect in an ordinary public library. He could not say that architects had made much use of it, for there were very few public libraries in London that could be referred to with any comfort or happiness, as the architects seemed to be altogether at sea, using up details originally designed for board schools or public baths and washhouses, and other useful buildings of the vestry type, with the most illiterate kind of effect —something unhappy, unpoetic, and unspeakable. If public libraries supported by the rates had been plain as workhouses, it would, he thought, be of benefit to the City in which we unhappily live.

Mr. BRYDON, in reply, said that the point raised by Mr. Statham about ventilation had been answered by Mr. Pite. In the Congressional Library at Washington, the air was so purified that it was practically free from dust, and the windows were kept closed on purpose to prevent dust getting upon the books. He should like to say that the Institute was especially indebted to those American architects and others who had so cordially sent the drawings exhibited upon the walls; they had sent them with the kindest possible expression of goodwill to the Institute and to those who would be present at the reading of the Papers. His request for illustrations and particulars had been responded to in the most fraternal manner, and with appreciation of the opportunity of showing to British architects the work that had been done in America. He would therefore move a very cordial vote of thanks to them for their kindness in sending the illustrations for their inspection.

Mr. Burgoyne having briefly responded, Mr. Brydon's motion was put from the chair and carried by acclamation.

Mr. Sidney R. J. Smith [*F.*] sends the following note:—

I should like to add a few remarks on the subject of the Papers. It is most desirable that rooms should not form passage ways to other rooms or parts of the building. In a recent competition in which I was assessor this was a very common fault. In most designs I also consider that the lending library should be central, so as to control, as far as possible, all parts of the building, and that the librarian himself should not be made an inspector of the public rooms in any way. It is also absolutely essential, if an indicator is used, to have ample light on it. I have seen a library in the North of England, recently built, where the light was on the back, not the front, of the indicator, and I suggested to the librarian that instead of burning the electric light all day, as he was doing, a reflector should be placed at a suitable angle to throw the light from the back windows on to the front of the indicator. Of course all are aware that in many libraries there is no indicator, but the public are allowed to take whatever books they please, and are admitted to this book store through a turnstile. This seems to work very well indeed, and books are seldom, if ever, lost.

The advantage of having glazed tiles or bricks as dadoes to all public parts cannot be overestimated. The wear-and-tear on libraries is greater than on any other public building, and walls get greatly damaged in even a few months. I wish to support the vote of thanks to Mr. Burgoyne, with whom I have worked for some years. I think I am correct in saying that he and I practically carried out the first public library in London (at Norwood), on which all recent libraries have been based. I should also like to support the vote of thanks to Mr. Brydon, for I consider he has mastered the subject in a most thorough manner, and his library at Chelsea is certainly one of the best, if not the best, in London, both as regards plan and architecture. I regret I am called away to the country, as I should like to have been present and said more on the subject than I can express in a short note.

THE ARCHITECTURAL ASSOCIATION SKETCH-BOOK.

THE subscribers to this unique publication seldom fail to express their appreciation of it, either to the editors or one or other of the members of the Sketch-book Committee, and these officials are thus encouraged and stimulated in their endeavour to still further enhance the value of the work in which they are so keenly interested. The conjecture that a "sketch-book" is of necessity no more than a mere haphazard conglomeration of nebulous scraps and pretty jottings culled from the brief holiday pocket note-book, with an interest purely ephemeral save to our individual selves, is an obvious fallacy if it be directed towards the *A. A. Sketch-book.* This publication proclaims on each of its varied sheets the solid and complete records which it affords of our ancient and too often fast decaying buildings, and its importance on this account alone is of inestimable value to all students of architecture and archæology alike. In addition, it has another and a still more widely diffused significance. As a chronicle of progress both in the methods of draughtsmanship and in the processes for the reproduction of drawings, each successive volume affords an ample and yet withal concise history. Both the measured drawings and the sketches, moreover, are presented in a manner so fascinating that they are no less attractive to those whose pursuits do not of necessity compel an intimate acquaintance with such details.

From its earliest days the committee of the *A. A. Sketch-book* has fostered a laudable spirit of cosmopolitanism in its tendencies, and, moreover, it is a body both progressive and ambitious. Its axioms have always been, first, to select the best possible subjects, irrespective of transient architectural fashions; secondly, to obtain the best possible drawings of such subjects; and, thirdly, to reproduce these drawings by the best possible means at its disposal. That the committee is insatiable in its ambition for the continual improvement of the publication is evidenced by the enthusiastic suggestions which are constantly brought forward for discussion; but though the *Sketch-book* has neither dividends to earn nor profits to make (and herein is advantageously placed as compared with other publications), yet of necessity improvements can only become possible by means of a constant, permanent, and increased circulation. On the other hand, there is no desire to attain such a number of subscribers that the intrinsic value of this publication might be injured, and, as heretofore, the committee is still determined to limit the edition to 400 copies. At the present time, from causes such as those which affect all societies, there are some vacancies for new subscribers, and, as a commencement is about to be made with a new volume, it has been thought desirable that the attention of the members of the Royal Institute and others might be drawn to the list of contents, which, by the courtesy of the Institute authorities, is inserted below. As will be seen, the list of subjects to be illustrated in the forthcoming parts are, as usual, most comprehensive in character, and the names of the contributors of the various plates are a more than sufficient guarantee for the quality of the drawings themselves. Moreover, it is not perhaps so widely known as it might be that by contributions of suitable plates subscribers may become entitled to a considerable rebatement, or even a complete elimination, of their nominal subscriptions of one guinea per volume of seventy-two plates, all of which are reproduced in a manner which cannot be surpassed.

Henceforth the *A. A. Sketch-book* will make its appearance regularly at quarterly intervals, each containing monthly parts, so that the twelve parts, forming a complete volume, will be brought out annually.

In view of the reawakened interest which is now being taken in colour decoration generally, the able editors of the *Sketch-book*, Messrs. W. G. B. Lewis and W. A. Pite, feel it imperative to indulge in more colour plates than heretofore; but the possibility of such a desirable end being attained rests, of course, not with the editors or committee or the other officials of the publication, but solely depends on the possibility of obtaining a full roll of subscribers.

In the libraries both of the Royal Institute and the Architectural Association may be seen the well-thumbed copies of the current numbers, which testify with a vast eloquence to its worth and utility to students of all ages, and the esteem in which they hold the *A. A. Sketch-book.*

R. S. Balfour.

Contents of the A.A. Sketch-book, Vol. IV.

Part 1.

- Corsham Almshouses. Master's Desk (W. Haywood).
- Blackheath Morden College. Organ Loft (J. G. N. Clift).
- Lacock Abbey. View and Details (W. Haywood).
- Montacute. View along E. Front (W. Haywood).

Part 2.

- Heckington Church. Easter Sepulchre (A. B. Pite).
- Reindeer Inn. Plan and Ceiling, Window, Chimney-piece and Details (John Stewart).
- Fairford Church. Screens (John Stewart).

Part 3.

- Clare College, Cambridge. Plan, River and Street Fronts, S.E. and W. side Quad (T. Tyrwhitt).
- Wraxell Manor. Fireplace (W. Haywood).
- Abingdon Church. Candelabrum (John Stewart).
- Granada. Charles V. Palace Elev. (A. T. Bolton).

Particulars and subscription-forms can be obtained of Edgar H. Selby, Hon. Sec. *A.A.S.-B.*, 8 Buckingham Street, Strand, W.C., or at the office of the Architectural Association.

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HEREFORD CATHEDRAL, FROM THE SOUTH-EAST.

HEREFORD CATHEDRAL.

The Cathedral Church of Hereford: A Description of its Fabric, and a brief History of the Episcopal See. By A. Hugh Fisher. 8o. *Lond.* 1898. *Price* 1s. 6*d.* [*Messrs. George Bell & Sons, York Street, Covent Garden, W.C.*]

In a little over a hundred pages Mr. Fisher has given a concise account of the interesting Cathedral Church of Hereford and a short history of its See. Although one of the smaller cathedrals, Hereford is a building of great architectural interest, and all styles from Norman to Perpendicular are well represented. Like nearly all our cathedrals, it has been since the Norman period considerably lengthened eastward, but its ground plan has preserved perhaps to an unusual extent its Norman form, and the main walls of its presbytery are practically intact, and the sombre effect of this part of the church gives it a dignity lacking in larger buildings. The nave, although terribly mutilated by Wyatt after the fall of the western tower in 1786, has a rich Norman arcade, and the south transept is almost wholly of Norman date. The Early English period is well represented by the Lady Chapel, standing on a crypt, and somewhat extensively restored by Cottingham in the early forties. The north transept is early "Decorated," with a curious series of straight-sided arches, curious but hardly beautiful. To a later period belongs the sturdy central lantern, with its profusion of ball-flower ornament, somewhat resembling Salisbury in the arrangement of its belfry stage, and bearing strong evidence of having originally been

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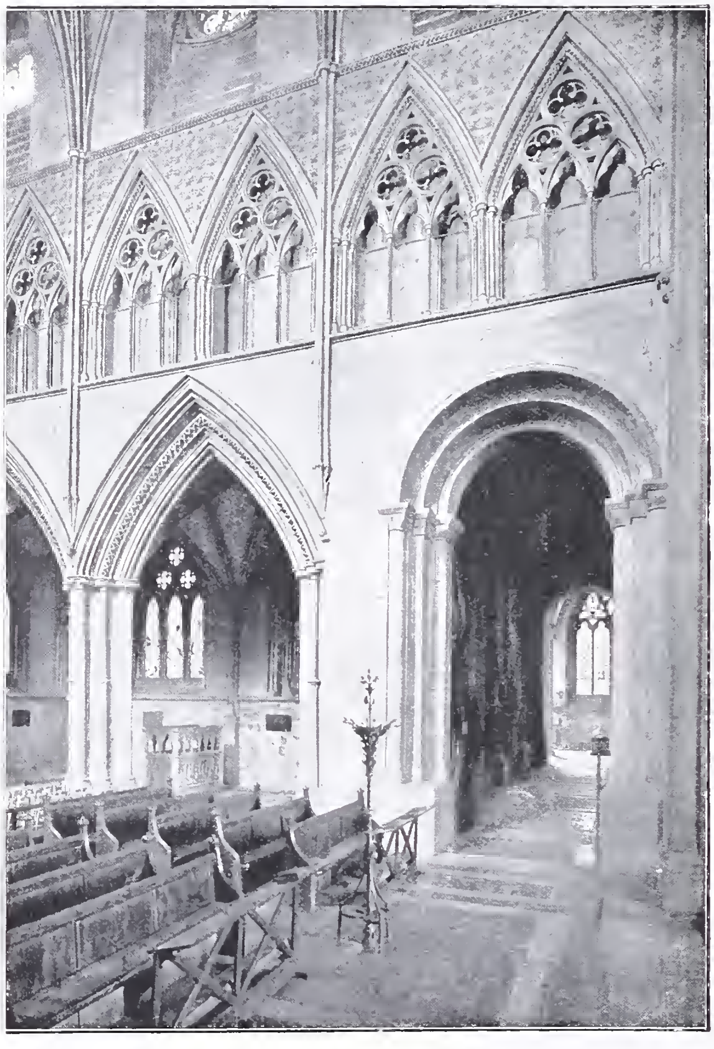
THE CRYPT, HEREFORD CATHEDRAL.

designed to carry a spire. A lofty spire covered with lead existed apparently until Wyatt's time, and the effect of the tower would be much improved by an addition of something on the same lines. There is less work of the Perpendicular period than of preceding styles; but of this date are the cloisters, the north or Bishop Booth's porch, the Stanbury Chapel north of the presbytery, and the richly decorated chantry of Bishop Audley on the south side of the Lady Chapel. The sacristy seems to have been extended at this period and alterations made to the south transept. The Chapter-house on the east side of the cloister is now in ruins. It was of Decorated date, a ten-sided polygon on plan. Hereford is particularly rich in monuments. There are in various parts of the building over fifty examples of effigies and other monuments, all of them with points of interest, and a large number of the greatest value. The beautiful Cantelupe shrine in the north transept, with its delicate Early English foliage, and series of small knightly effigies in its lower niches, and the neighbouring tomb of another of Hereford's bishops, Aquablanca, would in themselves make the cathedral noteworthy. Among others is the tomb of Bishop Stanbury, with good heraldic work on its north side, and the Bohun monuments on the north side of the Lady Chapel. In the south aisle is a valuable "map of the world," supposed to be of early fourteenth-century date, and very curious; and in the library are some interesting books, including a "Latin version of the four Gospels written in Anglo-Saxon characters," a manuscript, an ancient antiphonarium



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NORTH TRANSEPT, HEREFORD CATHEDRAL.

containing an old "Hereford Use," two Caxtons, and "The Nuremburg Chronicle completed in 1473."

All the foregoing and many other points are clearly described in the little book before us, and are well illustrated by a series of excellent reproductions from photographs and old engravings. An old view from the north, facing page 22, shows the central spire and western tower as it existed at the end of the seventeenth century, and another on the preceding page, from a drawing by Hearne, well illustrates the havoc caused by the fall of the western tower. The photographs of the north porch, the north and south transept, and the crypt of the Lady Chapel may be noted among the large number of excellent illustrations. The letterpress has been divided into four chapters, dealing with the history of the building, the exterior, the interior, and a short account of the See. At the end is a ground-plan, which hardly seems worthy of the book. Its scale is large enough for the dates to have been shown and the principal monuments indicated, and it loses much by not having been more carefully prepared. Apart from this failing, the book can be recommended as a handy and well-written guide to one of our smaller but most interesting cathedral churches.

Roland W. Paul.

DISCOVERY OF RELICS OF BUDDHA.

Archæological Survey, N.W.P. and Oudh Circle. Progress Report of the Epigraphical Section for the Working Season of 1897–98. *From A. Führer, Ph.D., Archæological Surveyor, N.W.P. and Oudh.*

There are two *Reports* in this publication, but Dr. Führer's is by far the most important from its containing details of the discovery of some of the relics of Buddha. Multitudes of relics of Buddha are said to exist, and many are mentioned as having existed in former times—such as teeth, bones, nail-parings, hairs, &c.—but, so far as I can recollect at the moment, the relics that have lately turned up are the only ones that are authenticated by an inscription, and by an inscription which seems to be accepted as reliable by our best authorities on such matters. There are other conditions connected with the discovery which help to confirm this judgment.

It may perhaps be as well to describe here—although not given in the *Report*—some of the details of Buddha's death and cremation, for the benefit of those who may not chance to be familiar with them. The account is contained in an old Pali Sanskrit work entitled the *Mahâ-Parinibbâna-Sutta,* or "The Book of the Great Decease." This has been translated by Professor Rhys Davids, and is published in the *Sacred Books of the East.* According to this authority, Buddha died at Kusinârâ, or Kusinagara, as it is more generally written, where he was cremated; and eight kings or chiefs sent messengers to claim a portion of the relics. These were divided, and each of the eight messengers carried away a share to his own country, where stûpas, or monuments, were erected over them. Buddha belonged to the Sākya tribe of Kapilavastu: from this tribe he derived one of the many titles he is known by, that is, Sākya-mûni, or the "Wise Man of the Sākyas." It is understood that the Sākyas received some of the relics after the cremation, over which a stûpa was erected; and it is this monument, with its relics, which has lately been discovered; and their great importance, from the confirmation they give to the history of Buddha, is recognized by all who are familiar with the subject.

The sites of these old towns, like so many others in India, have long been lost. A little over twenty years ago Mr. A. C. L. Carlleyle, who was then on the staff of the Archæological Survey, believed he had discovered the site of Kapilavastu a little to the east of the town of Oude, on the Ghogra River.* Sir Alexander Cunningham, who was then at the head of the department, accepted the identification of the spot; but that, of course, must now be given up, as the inscriptions found on the newly discovered site seem to leave no doubt as to its being the real one.

The site of Kapilavastu which has been lately discovered is on the Nepal frontier, and may be briefly described as nearly direct north from the town of Gorakhpur, a place that will be found on most maps of India. There are mounds extending from east to west for several miles, and under these mounds are the remains of the old city. It was at a place called Padariā, situated among these mounds, and about five miles within the Nepal territory, that the lower part of a Buddhist Lat,† or stone pillar, was found. The broken portion has not yet been discovered, but the part that remains is evidently on the site where it was first erected.

Towards the base of this Lat is the following inscription: "King Piyadasi, beloved of the gods, having been anointed twenty years, came himself and worshipped. 'Here Buddha-Sākyamuni was born.' And he caused to be made a stone [slab] bearing a big sun; and he caused a stone pillar to be put up, because here the Worshipful One was born. The village of Lummini has been made free of taxes, and a recipient of wealth." It is probable that this translation is not a perfect rendering of the Sanskrit, for I have seen more than one version of it; but it at least conveys the main facts. In the history of Buddha it is stated that he was born at Kapilavastu, in the Lumbini Garden. King Piyadasi, also known as Asoka, is here stated to have visited the spot where "the Worshipful One was born;" and the name Lumbini is so close upon that of "Lummini" that they may safely be taken to mean the same place. Asoka reigned about the middle of the third century B.C., and at that date the site of Kapilavastu could not have been lost. It ought also to be mentioned that the Sanskrit characters of the inscription are accepted as being those of Asoka's period. This discovery of the site of Kapilavastu and the Lumbini Garden will most probably be looked upon as of far greater historic interest than even the finding of Buddha's relics.

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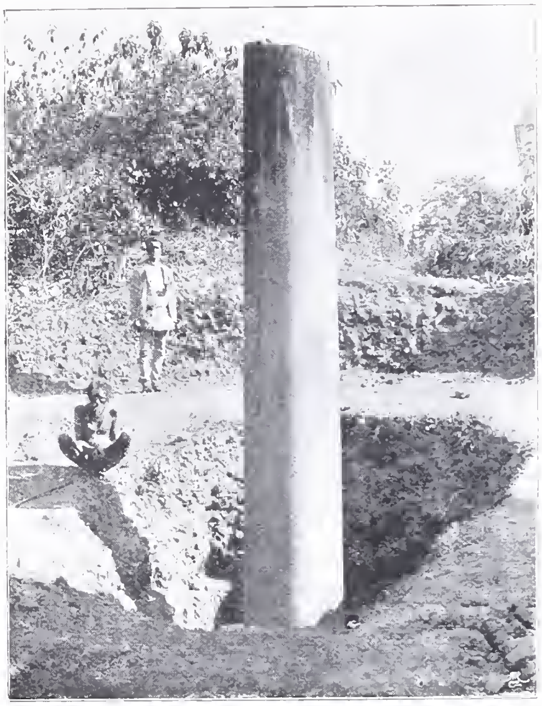
* See *Archæological Survey of India: Report,* 1874–1875 and 1875–76, vol. xii.

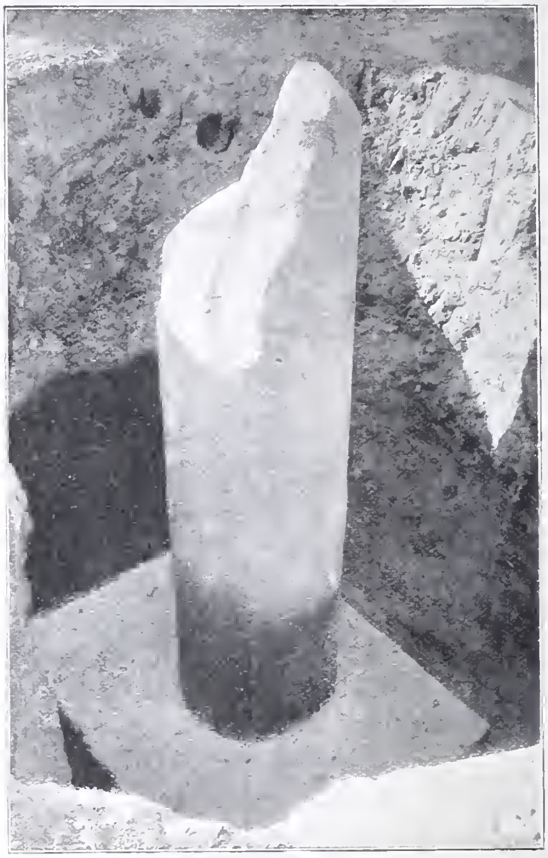
† "Lat" means a "walking-stick," to which these long pillars have a resemblance.



ASOKA PILLAR AT PADARIĀ, MARKING SITE OF LUMBINI GARDEN, BUDDHA'S BIRTHPLACE, NEPAL TERAI.

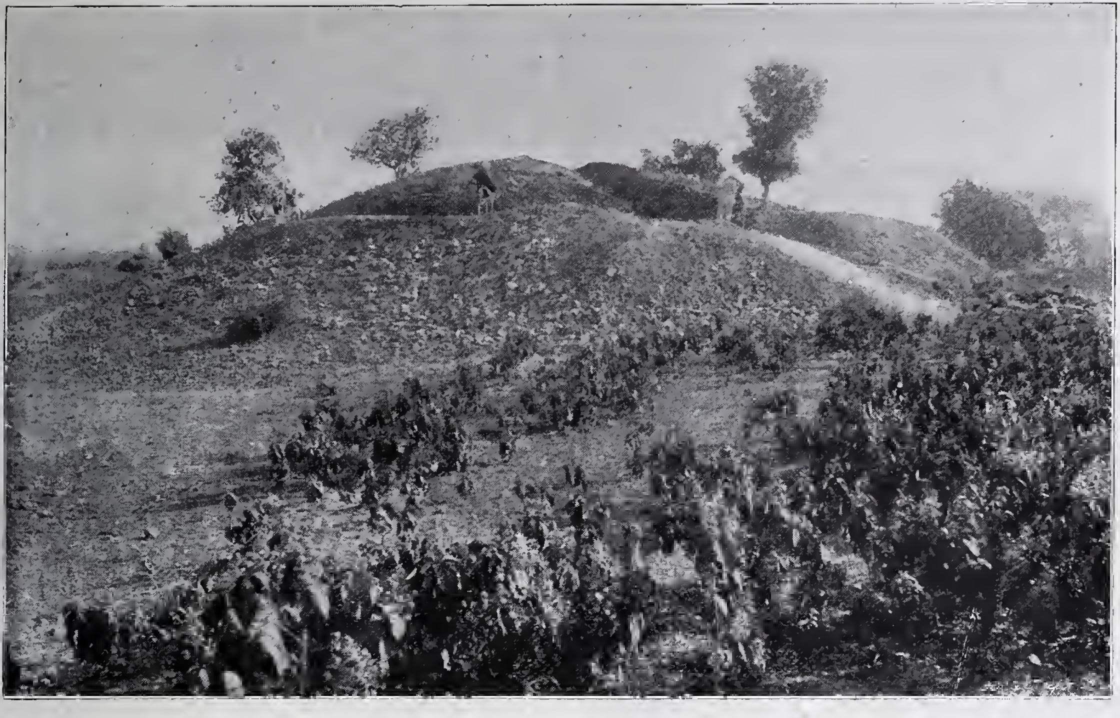
The clue to this historical spot was the previous discovery at the village of Gotīhiva—one account calls it the village of Niglīva—of a stûpa and the lower part of a pillar with an Asoka inscription, of which the following is a partial translation: "When the God-beloved King Piyadasi had been anointed fourteen years, he increased the Stûpa of Buddha Konākāmana for the second time; and when he had been anointed . . . years, he himself came and worshipped it, and he caused it to obtain. . . ." This Stûpa of Konākāmana, or Kanaka-muni—one of the three Buddhas that appeared before Buddha Sākya-muni—is mentioned by Hiuen Tsiang, the Chinese pilgrim, with its distance and direction from the Lumbini Garden; and it thus became a finger-post to the explorers. The discovery of this monument is also of some historical interest from its bearing on the question as to how far the Buddhism of Sākya-muni was an original system, or only the continuation of a previous form of Buddhism that had existed from a remote period in India.

The increasing of the stûpa, mentioned in the inscription, is a process that has been noted before. This was done by building all round the structure, that is, encasing it with a new surface, and thus increasing its size and importance. This would only be done with shrines that had a great sanctity such as this, which was believed to be that of a former Buddha. According to the inscription, Asoka had twice repeated this operation.



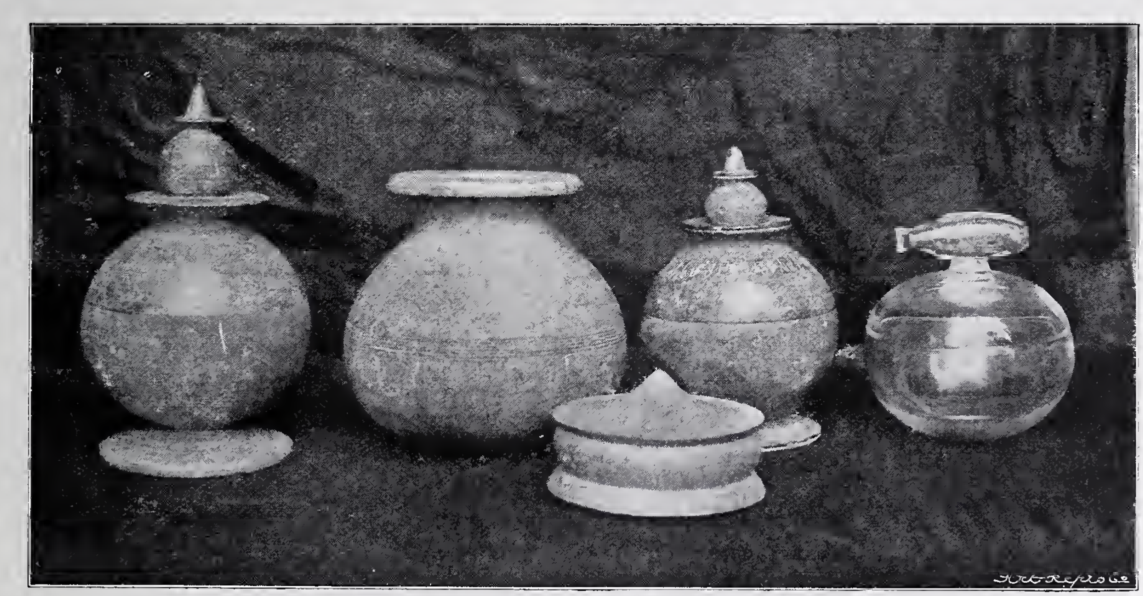
PILLAR OF KANAKA-MUNI, WITH ASOKA INSCRIPTION, AT GOTIHIVA, NEPAL TERAI.

These sites were all within the Nepal territory, but the stûpa containing the relics of Buddha is about half a mile within the British frontier. This is near to the village of Piprâva, in the Birdpur Estate, in the north of the Basti District, where a large mound exists on one of these estates, belonging to W. C. and G. Peppé. Mr. W. C. Peppé, being a trained engineer and surveyor, was led, from the finds already described, to make explorations on this mound, which



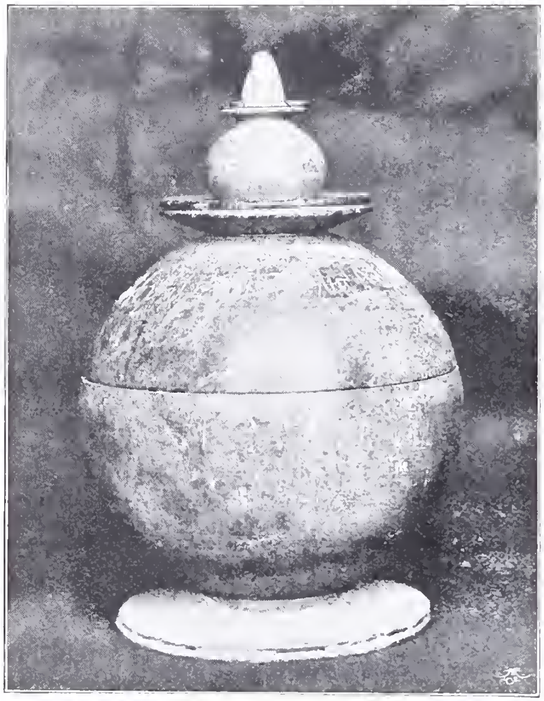
MOUND OF BUDDHA'S RELIC STÛPA AT PIPRÂVA, BASTI DISTRICT. SOUTH-WEST VIEW.

turned out to be the ruin of a stûpa. The relic-chamber appears to have been easily discovered. It was found to be a massive box formed of white sandstone, with a lid of the same material: its internal capacity was 4 feet 4 inches by 2 feet 8 inches and 2 feet 1¼ inch. In it were three vases of steatite, a small circular box of the same, and "an exquisitely finished casket of rock crystal." There were also the remains of a box, or casket, of fragrant red sandal-wood, but



CASKETS FOUND IN BUDDHA'S RELIC STÛPA.

in a very decayed state. In it "had been enshrined portions of the bone relics of Gautama Buddha, collected from his funeral pile," but they were also in a condition of very great decay. The largest of the steatite urns was 7 inches high, another was 6 inches, and the smallest was 5½ inches. The rock crystal casket was 3½ inches. The steatite, or soapstone, vases have been very carefully turned in a lathe, and resemble closely those that Cunningham found in the stûpas near to Sanchi.



THE CASKET, WITH SANSKRIT INSCRIPTION AND RELICS, FOUND IN BUDDHA'S RELIC STÛPA.

The identification of the relics contained in these vases is derived from a Sanskrit inscription which goes round the upper portion of the smallest of the three steatite vases. This has been translated as follows: "This relic-shrine of divine Buddha [is the donation] of the Sākya Sukiti brothers, associated with their sisters, sons, wives." The characters are as old at least as the time of Asoka; the late Dr. Bühler has suggested that they might be earlier; but, be that as it may, our best authorities appear to accept the inscription as satisfactory evidence that this was the stûpa built by the Sākyas of Kapilavastu to enshrine the portion of relics they received after the cremation of Buddha at Kusinagara; and thus agreeing with the statements found in "The Book of the Great Decease."

A great many small articles were found mixed with the ashes, such as gems, pearls, beads, little objects in gold and silver, and figures of various kinds formed with gold leaf. These were no doubt intended to represent the "seven precious substances" which are often referred to in books as having been placed in stûpas.

A newspaper paragraph has lately announced that the relics of Buddha are to be presented to the King of Siam, who, it may be recollected, came here on a visit not long ago. To him, being a devout Buddhist, these precious objects will be particularly sacred, and it may be expected that he will erect a grand and suitable structure for their preservation. It will be an interesting point to know that a notable Buddhist temple or shrine is being built in our own time, and to learn what particular form and character it will assume. The celebrity of the relics will no doubt make the temple a place of pilgrimage which will be visited by Buddhists from all parts of the East.

In addition to Dr. Führer's *Report* on the explorations at Kapilavastu, there is a *Report* by Mr. Ed. W. Smith, M.R.A.S., on the architectural survey of Akbar's tomb at Sikandrâ, and of the Jahângîri Mahal, in the Fort at Agra, in which some progress has already been made.

I understand that Dr. Führer has resigned his position as head of the Archæological Survey, and is to be succeeded by Mr. Ed. W. Smith.

William Simpson.

GREGOROVIUS'S *HADRIAN*.

The Emperor Hadrian: A Picture of the Græco-Roman World in his Time. By F. Gregorovius. Translated by Mary E. Robinson. 8o. *Lond.* 1898. [*Messrs.: Macmillan & Co.*]

Two or three short chapters on sculpture and architecture added to a life of Hadrian may in the hands of a Gregorovius serve to convey some impression of the extent of that emperor's encouragement of the fine arts. But they are far from sufficient to illustrate the character of the artistic renaissance of that time, which is just what we most want to know about Hadrian. We cannot blame Gregorovius for not being aware that the Pantheon had been rebuilt by that Emperor, because the fact was not known, if I remember rightly, in 1883, when the last edition of his *Life of Hadrian* appeared. But a translator who takes in hand a book of research which is already fifteen years old might be expected to edit it in some measure.

As regards the translation, it seems to me very agreeable reading except in some parts where it has to do with sculpture. What, for instance, could be worse than to read (page 445), "Stephanus also carved the Menelaos; and the beautiful group of Electra and Orestes in the Villa Ludovisi are supposed to be original"? The Menelaos here referred to was a sculptor, and had been *trained* not *carved* by Stephanus, as is well known from the inscription on his group of

Orestes and Electra in the Villa Ludovisi. The word used by Gregorovius is *bildete.* On page 348, "the torso of the weeping Niobe" should be read the "*hurrying Niobide,*" the word in the German being *fliehende* not *flehende.* It was perhaps natural enough to think of Niobe as "weeping," but when Gregorovius further describes the torso as being in the Vatican and as "a copy of the Iris of Phidias from the Parthenon," any one with the least knowledge of the remains of ancient art would at once recognise the hurrying Niobide. The same want of acquaintance with this branch of her subject is shown by the translator when she turns the German *Marmorschranken* into *coffers of marble* (page 345), the reference being to the two large bas-reliefs in the Forum near the Arch of Severus. On page 365 the "Panathenian stadium over the Ilissos" should be "beyond the Ilissos;" p. 187, for φλυρίας read φλυαρίας, and on page 351 for Welker read Welcker. In a number of instances the Greek accents are wrong.

A. S. Murray.

NOTES, QUERIES, AND REPLIES.

Skeleton Buildings.

From R. Langton Cole [*A.*]—

I should like to comment upon two points raised by the discussion on Mr. Gibson's Paper, "Fireproof Construction in the United States," published in the Journal of 10th December last. I intended to do so earlier, but have been prevented by want of time, and I trust the interest of the subject will excuse my writing after so long an interval.

In reference to Mr. Delissa Joseph's remarks, it is quite true that the ratio of open spaces to solids, required by the Building Act in London, does limit the extent to which fronts can be constructed of iron and glass, above the ground-floor story; but this limitation is not, I think, more than is imposed by considerations of convenience and appearance. A glance at the published photographs of the Bank of Syracuse will show that the openings in its walls are well within the limits of our Act, but this restriction has not prevented the use of the skeleton frame as the real structure of the building.

There is no necessity, in London, to do more than enclose one half of the area of the external wall of each story with brickwork of the thickness proper to the *height of the story itself,* for the height of every wall standing on a bressummer commences from the bressummer—section 5 (7 and 10). It follows that there would be very few cases in which warehouse walls need be more than 14 inches thick, with recesses where desired, and those of other buildings 9 inches thick; less than this would hardly be weather-proof or convenient.

In regard to the bearing of the bressummers, a point raised by Mr. Solomon, I do not think that the words of section 56, taken together, bear the construction he puts upon them. As I read it, the bressummer is to have a bearing on an iron story-post in addition to any bearing *it may have* on any party wall, and the possibility of its having no such bearing is recognised by sub-section 4.

That this view is accepted in practice is shown by a row of lofty shops in Finchley Road, which have the bressummers over the ground floor bearing on an H iron stanchion placed in front of the party wall, and common to both sides of the latter. These stanchions have since been cased with thin granite pilasters and cement splays, but this is only the American fashion in use in England.

Whether the use of skeleton framing is of advantage or not must depend on the circumstances of each building; my point is that there is nothing in the London Building Act to prevent its adoption.

Cav. Boni's Discoveries at Rome.

Mr. John Hebb [*F.*] sends for publication the following extracts from a letter he received from Cav. Giacomo Boni [*Hon.Corr.M.*], written a few hours after his recent discoveries at the Roman Forum:—

"Now that the tomb of Romulus has been recognised as such, and I am not looked at with such painful suspicion as I was yesterday morning when my conviction was ripe, I think it may interest you, from a mere psychological point of view, to know what are the sensations which precede and accompany discoveries which are not casual.

"A general nervous restlessness preceded my discovery of the cella of the Temple of Vesta, and of the arch of the Temple of Julius Cæsar. The idea that the supposed basement of an equestrian statue close by the *Rostra Vetera* could only be the *Rostra Vandalica* struck me one night, and I got up and dressed myself to wait for daybreak, when, going down to the Forum, I ascertained the existence of the holes through which passed the prows of the ships.

"A few weeks ago I noticed that a rounded piece of travertine towards the south side of the Forum could only belong to a *margo* [curb], and there I found the road which corresponds with the *Via Sacra* which went from the *Regia usque in Arcem,* and the idea struck me like lightning that the same road went originally straight to the major axis of the Colosseum, and that the Arch of Titus must have been displaced by Hadrian from the original *summa Via Sacra* to its present site.

"Following the branch of the road which passes now under the Arch of Septimius Severus, I reached the *Comitium,* a piazza paved with slabs of travertine, and began to realise how the Temple of Concord faced it, as if the goddess were trying to join the rival hands of the patricians and of the people. The same painful excitement which I had experienced on previous occasions overcame me as I directed my workmen towards the front of the Curia or Senatus. Last Friday I told them: 'There, a few yards ahead of you, a black stone is to be found.' 'It is there,' replied one of them. 'How do you know it is there?' I asked. 'Because you told us, and we always find what you tell us.' On Monday evening (it was after sunset and almost dark) the same workman ran after me and said: 'I have found it!' 'What?' 'The black stone.' Yesterday morning I identified the *nero antico* as the *niger lapis* of Festus, and entered in my usual state of calm, with almost a touch of indifference for what I found.

"Summing up my fresh impression, I think that discoverers do not deserve any special praise for such results as they cannot help attaining. I only wish it were less painful to attain them."

MINUTES. VIII.

At the Eighth General Meeting (Ordinary) of the Session, held Monday, 20th February 1899, the President, Professor Aitchison, R.A., in the Chair, with 16 Fellows (including 4 members of the Council), 27 Associates (including 1 member of the Council), 1 Hon. Associate, and several visitors, the Minutes of the Meeting held 6th February 1899 [p. 208] were taken as read and signed as correct.

The decease was announced of James Murray, elected Associate in 1851, Fellow in 1867, and placed on the list of Retired Fellows in 1889.

The following members attending for the first time since their election were formally admitted and signed the respective Registers—viz. Henry Hoyne Fox, *Fellow*, and Henry Albert Collins, *Associate*.

Papers on PUBLIC LIBRARIES by Mr. J. M. Brydon [*F.*] and Mr. F. J. Burgoyne having been read, and illustrated by lantern-slides, a discussion ensued, and a vote of thanks was passed to the authors by acclamation.

On the motion of Mr. Brydon, the cordial thanks of the Institute were accorded the American architects and others who had courteously furnished him with particulars of the libraries treated of in his Paper, and for the loan of designs, drawings, and photographs exhibited in the Meeting-room in illustration thereof.

The proceedings then closed, and the Meeting separated at 10.20 p.m.

LEGAL.

The London Building Act: Exempted Building.

The case of *Drury v. Rickard*, heard in the Queen's Bench Division on the 6th February, was a special case stated for the opinion of the Court by a Metropolitan Police Magistrate. The material facts and the gist of the judgment of the Court, as reported in the *Law Journal*, are as follows:—

The respondent, a builder, employed by one Pawley, was engaged in erecting certain buildings in the parish of St. Margaret, Westminster. By agreements, dated 19th November 1897, Pawley agreed to grant to the Commissioners of Her Majesty's Works leases of the pieces of land on which the buildings were being erected, and the buildings, for twenty-one years from 25th December, 1897, or so soon thereafter as the buildings should in the opinion of the officers of Her Majesty's Office of Works be fit for occupation, at the yearly rent of £4,625. The agreements further provided that the occupation of and the rent for the premises should commence as soon after 25th December 1897 as in the opinion of the officers the premises should be fit for occupation, and that the Commissioners might take possession of such rooms as might be completed before the whole building was ready for occupation, at a proportionate rent. The buildings having exceeded 80 feet in height, the appellant, as district surveyor under the London Building Act 1894, served upon the respondent notices that the buildings were not in conformity with the Act, and required them to be brought into conformity with it. The respondent claimed that the buildings were, by section 202, exempted from the Act, and the appellant admitted the exemption. Subsequently, on 1st June 1898, the appellant served on the respondent, pursuant to section 151 of the Act, a notice of irregularity requiring him to reduce the height of one of the buildings. On 5th July 1898 the respondent appeared to answer a complaint by the appellant in consequence of his not having complied with this notice. There was no evidence that the officers of the Office of Works had certified the building fit for occupation, but it appeared that an officer of the Commissioners of Works had visited and examined it and made suggestions. The magistrate held that the building was exempted from the Act by section 202, and dismissed the complaint subject to the statement of a case.

Upon the following points taken before him but not argued, the magistrate gave no decision:—1. Whether the building came within the exemption in section 202; 2. Whether the London County Council consented to the building being erected to a greater height than 80 feet; and, in the alternative, whether the Council waived the provision as to height and were estopped from insisting on its observance.

The question for the Court was whether the building was exempted from the provisions of the Act by section 202.

Section 47 of the London Building Act 1894 provides that "a building (not being a church or chapel) shall not be erected of or be subsequently increased to a greater height than 80 feet."

Section 202 provides that "there shall be exempted from so much of the provisions of this Act as relates to buildings and structures: . . . . any building, structure, or work vested in and in the occupation of any department of Her Majesty's Government. . . ."

F. F. Daldy (with him *H. F. Dickens, Q.C.*) for the appellant.

Horace Avory and *Hugo Marshall* for the respondent.

The COURT (Mr. Justice LAWRANCE and Mr. Justice CHANNELL) held that the building in question was not exempted from the provisions of the Act by section 202. It could not be said that it was "vested in" any Government department. The Commissioners of Works had agreed to take a lease of it for twenty-one years from 25th December 1897, or so soon thereafter as in their opinion it was fit for occupation. They were entitled to a lease on that date, but the other party could not compel them to accept one until they exercised their election. Specific performance could be enforced by the Commissioners only, and therefore, according to the doctrine of equity, no equitable interest in the building was vested in them. That being so, it was unnecessary to decide whether the building was "in the occupation" of the Commissioners. The magistrate's decision was wrong, and the case must go back to him both on that ground and also because he had not decided upon two of the points taken before him.

Obituary.—The death is regretfully recorded of Mr. Hayward Richardson Brakspear, of Sudbury, Middlesex, who passed the qualifying Examination and was elected Associate in 1888.

SOME EARLY CHRISTIAN CHURCHES IN PALESTINE.

By Arch. C. Dickie [*A.*].

Read before the Royal Institute of British Architects, Monday, 6th March 1899.

THE title of my Paper, "Some Early Christian Churches in Palestine," was chosen because of the difficulty in deciding at the moment what particular example, or examples, I should write about. Jerusalem is rich in these remains; many have been studied, and many more have only been favoured by passing notice, while there are still more to be discovered, hidden in the confusion of the city or buried by the accumulated *débris* now under cultivation without the walls. I shall, therefore, limit myself to a few churches in and about the city. Time and wantonness have left little to look upon, and a recovery of the plans is about the most that can be hoped for. Almost without exception, there is no single example existing in its original form, sufficient to convey to the casual observer any idea of what it once was. It is rare even to find a complete plan, and still rarer to find as much masonry standing as would give an impression of the original structure. The fanatical Chosroes, with his Persian hordes and Jewish allies, in the beginning of the seventh century, destroyed all within their reach, and the later buildings suffered in accord with the vicissitudes of the city's history. There is nothing which seems more hopeless than the attempt to trace a wall which dodges under a heap of *débris*, or becomes lost behind a more modern building. Sometimes it forms the interior of a house, where its detail is hidden by a thick coat of plaster, or adorns the sacred side of a domicile whose door even backsheesh will not open to you. The resources of a 50-foot wall, which has determined to play hide-and-seek with you, are great, and the clever way in which it effectually hides itself just at the most important point is a sore trial to architectural research. Most of these remains are of tiny churches, whose extraordinary variety of plan adds interest to their study and atones for the scantiness of the ruins.

The examples I have selected for discussion are the church of St. John the Baptist, eleventh century; an Armenian mortuary chapel, sixth century; and the church of the Pool of Siloam, fifth century.

Before putting these on the screen, I feel bound to say a word on the great cathedral church of the Holy Sepulchre. This wonderful building is far too vast a subject to do justice to in a paper which is devoted chiefly to a comparison of plans, and affords matter for a special paper by whoever may some day unfold its architectural story. Personally, I have, in my attempt, issued in more hopeless uncertainty than when I began, and shall therefore only

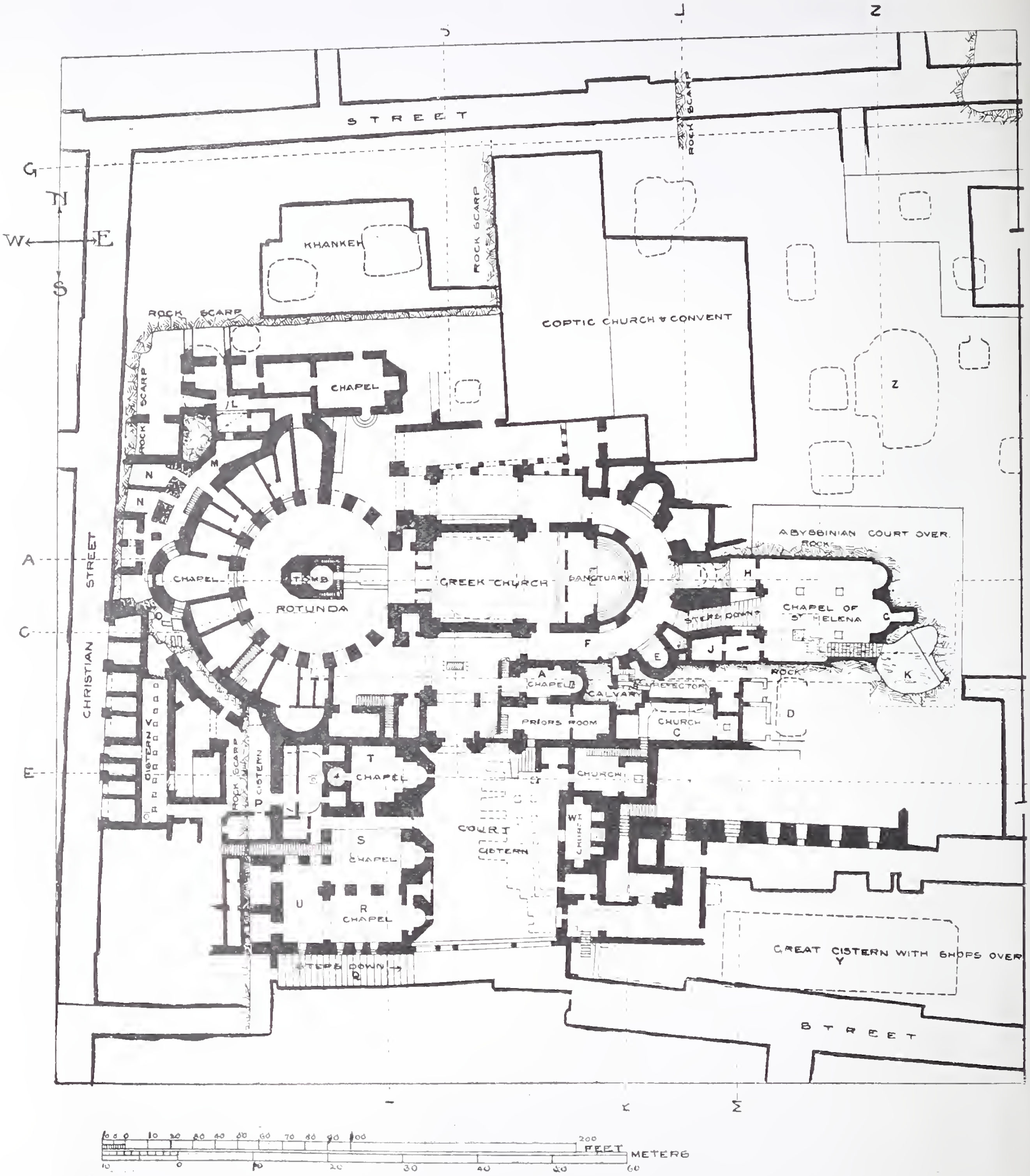


FIG. 1.—PLAN OF THE CHURCH OF THE HOLY SEPULCHRE, JERUSALEM. (From *Ordnance Survey and Additions*, by Dr. Schick.)

touch lightly on the subject, which is forced upon me by reason of its existence as the most important and most interesting early Christian church in Jerusalem.

Briefly, its history is as follows:—Constantine in the fourth century built a basilica over the site of the discovery of the true cross by Queen Helena, and a rotunda over the Holy Sepulchre, which seems to have been separated from the basilica by a cloister. These were burned and destroyed by the Persians in 614 A.D., and partly restored by Modestus soon after, with the addition of a chapel over Calvary and a chapel to the Virgin Mary. Arculf, who writes in the seventh century, gives a plan of the buildings showing the rotunda isolated, and between it and the basilica the chapel over Calvary and the chapel of St. Mary. The buildings were again destroyed and restored in the ninth and tenth centuries, and totally destroyed in 1010 A.D. by the Khalif Hakem. Not long afterwards they were restored, and in the beginning of the twelfth century the restoration of the Crusaders made the church much as we now see it. The chapels about the rotunda were then under one roof, instead of being isolated, and the site of Constantine's basilica is partly occupied by a cloister. Architecturally, the more recent researches have added but little to the works of Sir Charles Wilson, Professor Willis, Professor Hayter Lewis, and others. Dr. Schiek has recently contributed valuable records of the rock contours about the site, showing the original level of the rock and the levels of the cutting, proving that the platform, on which the buildings stand, had been cut down out of the rising rock, the lower sides of which were scarped. He has also recovered certain rock cuttings in the rotunda walls. The plan (fig. 1) is that of the present buildings, consisting of a rotunda, in the centre of which lies the supposed tomb of our Lord, and east of this the church extends in a nave and continuous aisle, terminating in an apse and chevet of three chapels; a more or less mutilated extra aisle, terminating in a square chapel, occurs on the north, and in the south aisle lies the chapel over Calvary. East of the apse, and reached by a flight of steps, is the crypt of St. Helena, where the tradition of the discovery of the true cross is located. This chapel lies under the court of the cloister, and its dome rises up through the pavement, at the level of which are the sills of the dome windows. In plan it is three-aisled; two terminate in apses, and one ends by a flight of steps which descends to the chapel of the Invention. The central aisle is divided into three bays by the columns

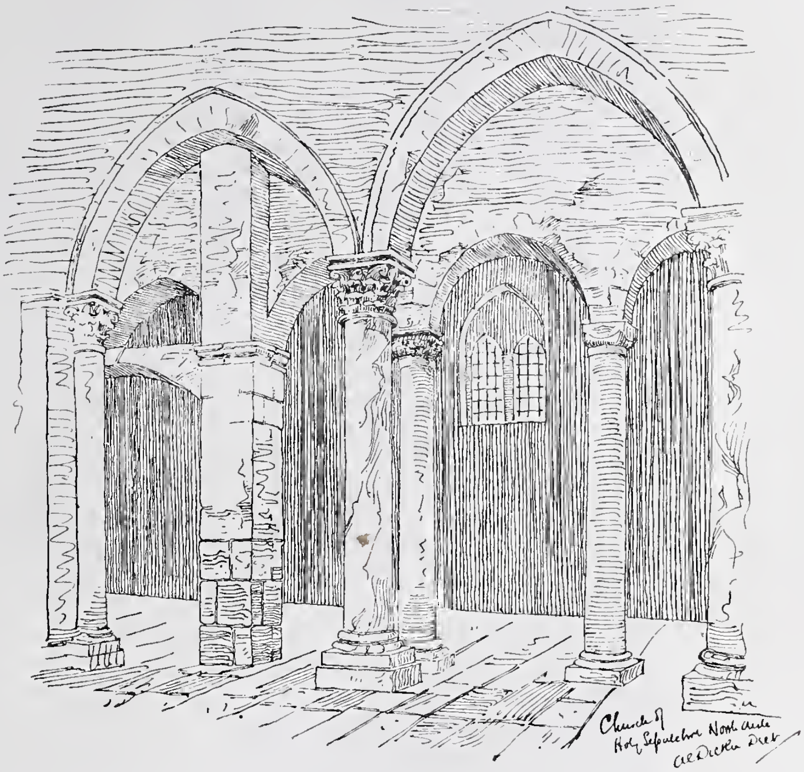


FIG. 2.—CHURCH OF THE HOLY SEPULCHRE, JERUSALEM: NORTH AISLE.

carrying the dome. The many chapels which are in and around the main church I need not discuss. The plan is curiously irregular in some places, and the distribution of its parts as puzzling as the internal details. A greater confusion of "additions and alterations" or a more unhappy conglomerate of beauty and garishness could not well be imagined. In the north aisle are three distinct colonnades standing, of different spacing, set one in front of the other, and each more or less independent of the other. The latest is probably the work of the twelfth century, and the two earlier colonnades may be the remains of the tenth-

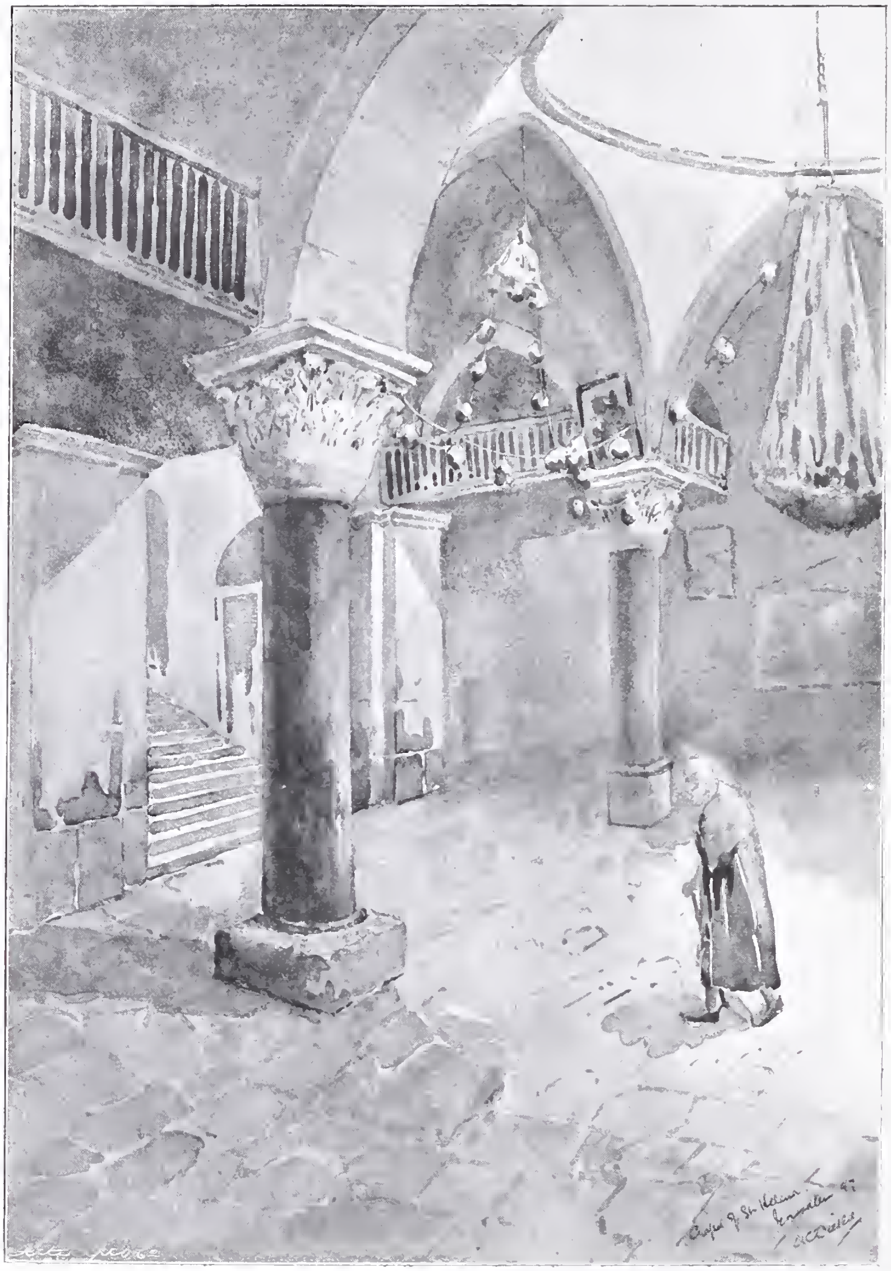


FIG. 3.—CRYPT OF ST. HELENA. (From a water-colour drawing by Arch. C. Dickie, 1897.)

eleventh century restoration. This strict preservation of the earlier remains is very striking. Nor is it confined to the north aisle alone; everywhere there is evidence of a determination to preserve the existing ruins, in spite of the fact that their frailty made them useless, and that they were different in plan. The sacredness of every stone seems to have been kept in the minds of the successive builders, who preserved where they could not utilise.

The rotunda is the restoration after the fire of 1808, and is more or less in its original form, except that all the piers are square. According to Sir Charles Warren in *The Temple or the Tomb*, the remains of some of the original shafts still exist, cased by the masonry of the square piers. The present dome was completed in 1867. The crypt of St. Helena is a particularly interesting mixture of stolen materials. Four shafts, fragments of various coloured marbles, set on irregular bases and capped by beautifully designed Byzantine capitals, three sizes too big, chipped off to fit the necks of the shafts, carry pointed arches and a dome with pendentives. The piers built against the rock walls are, I fancy, the earliest remains of the church, and the caps correspond in character to those of the earliest square pier of the north aisle already mentioned. The damp gloom of the aisles and the play of light from the dome windows give a unique charm to this quaint little interior, and make it a place of many impressions. The south façade is the only exterior part visible of the twelfth-century work. It is a thing of real beauty, but, unfortunately, it is also incomplete, and the full effect of the original composition is lost by the later insertion of a very beautiful tower on its west flank. The pointed arches, the delicate blending of classic and Gothic detail, and the exquisitely carved Byzantine foliage, add interest to its beauty, and the strong Provençal smack about it betrays the inspiration of its designer. It is difficult to believe that this and the loose and debased carving of the aisle capitals are by the same hand; they are very different in

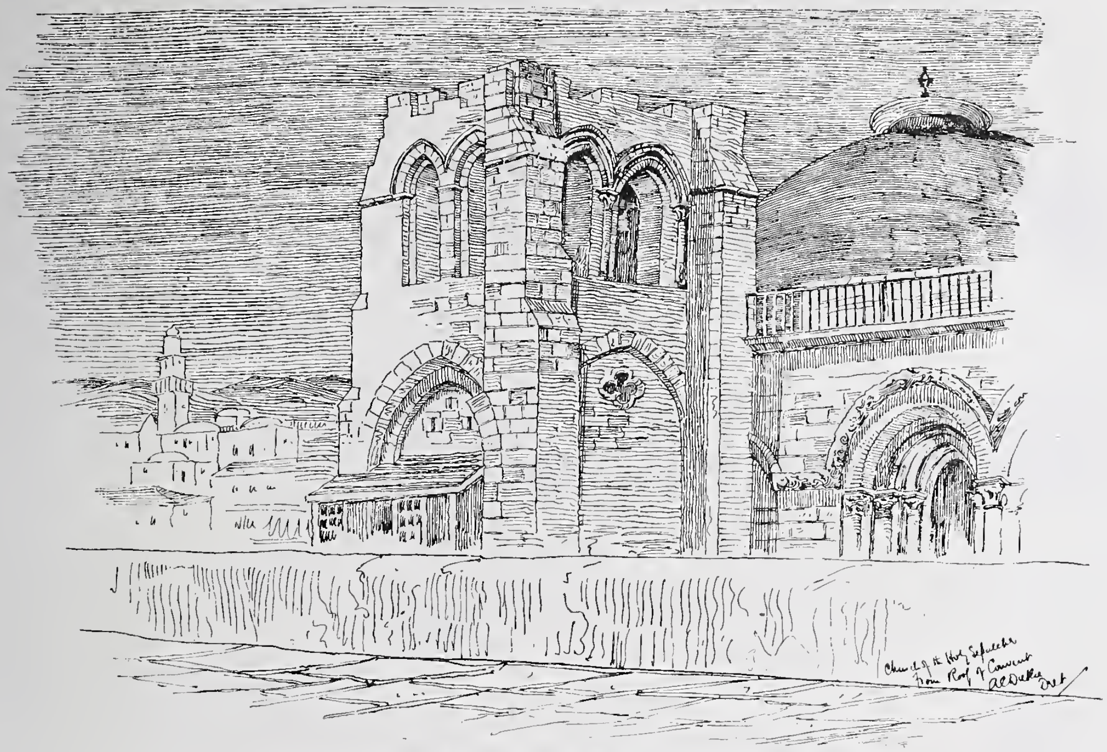


FIG. 4.—CHURCH OF THE HOLY SEPULCHRE, JERUSALEM, FROM ROOF OF CONVENT.

character, and point to other influences. Seen from the housetops the façade, with its domes and tower and the Mahommedan minaret in the foreground, is the most charming group of the city; the rich tawny colour of the weathered stone and the lead and white domes set in bright sunlight against the intense blue Syrian sky form a picture to be remembered. In front are the remains of an atrium, the column bases of which are *in situ.* The ruins of the eastern portico of Constantine's basilica and part of the east wall with the dowel holes for the marble facing can be seen partly preserved in the Russian chapel to the east, and partly in the shops of the bazaar, hidden behind a filthy miscellany. These facts have been very carefully gathered by Mr. Geo. Jeffrey, a Fellow of the Institute. The remains are only those of the east end, and the limits of Constantine's buildings have yet to be recovered, but sufficient is now known to indicate the position and greatness of the original church, which was destroyed by the Persians 614 A.D.

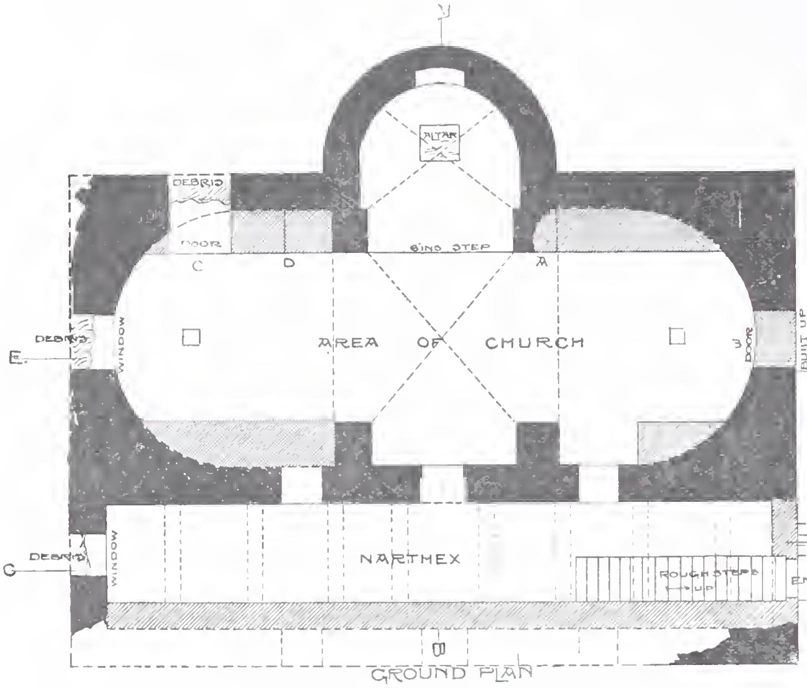


FIG. 5.—CHURCH OF ST. JOHN THE BAPTIST, JERUSALEM.
(Measured and drawn by Arch. C. Dickie, 1897.)

It seems absurd to pass over this great monument in so superficial a manner, but its further discussion is beyond the scope of the present Paper, and might lead to depths in which there would be much helpless wallowing.

The next three examples are interesting types of early church plans, which are as yet comparatively unknown outside the pages of the *Quarterly Statement of the Palestine Exploration Fund.**

The church of St. John the Baptist lies on the way to the church of the Holy Sepulchre, in Christian Street, adjacent to the Pool of Hezekiah. In 1865 Sir Charles Wilson reported this church in the survey of Jerusalem, but it was not until recently that it was measured up in detail. Over the original church a modern one has been built, very nearly on the same plan, and the ancient building now takes the place of a crypt, the surface of the ground being now at the level of the upper church floor. The section through the church and the Pool of Hezekiah is taken from a drawing by Dr. Schick, and shows the relative positions and levels as well as the original rock level and the level of the present street. The lower church is reached by a rude flight of steps on the south side descending into a narthex, from which three doors enter the main building. The windows are now blocked up by *débris*, and one has to depend upon the light of a candle in studying the masonry. It is quite evident, at first sight, that the restorer has been at work, but just how much he is responsible for is not so easily determined when one's vision is limited to the area afforded by the light of a tallow candle. However, I think the plan may be taken as correct, as there is abundant evidence in the bonding and character of the masonry to justify its acceptance. The late work, shown by hatched lines, hides the true form of the original church, which is triapsidal, divided into three bays by four attached piers at the crossing. The total length of the church north and south is 62 feet 9 inches, and the width 24 feet 9 inches, which the later wall thickening has reduced to 16 feet 6 inches. The west wall of the narthex is 6 feet 10 inches thick, which excessive thickness may be accounted for in the same way, and thus explain the absence of any evidence of the western entrances, which are restored by dotted lines on the plan opposite the three inner doorways, and which, at that time, would have been rendered useless on account of the accumulated *débris* 21 feet above the level of the original floor. Another doorway exists in the south end of the church, now built up. The floor of the eastern apse is raised 6 inches, and the original window is now formed into a recess. The altar stands complete, a rubble pedestal, 4 feet 1 inch by 3 feet 5 inches, by 3 feet 4 inches high, covered with a flat stone 11 inches thick. The present vaulting is late pointed, the centre bay having intersecting vaults and the flanking bays plain vaults.

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* The slides and drawings exhibited at the Meeting were kindly lent by the Palestine Exploration Fund.

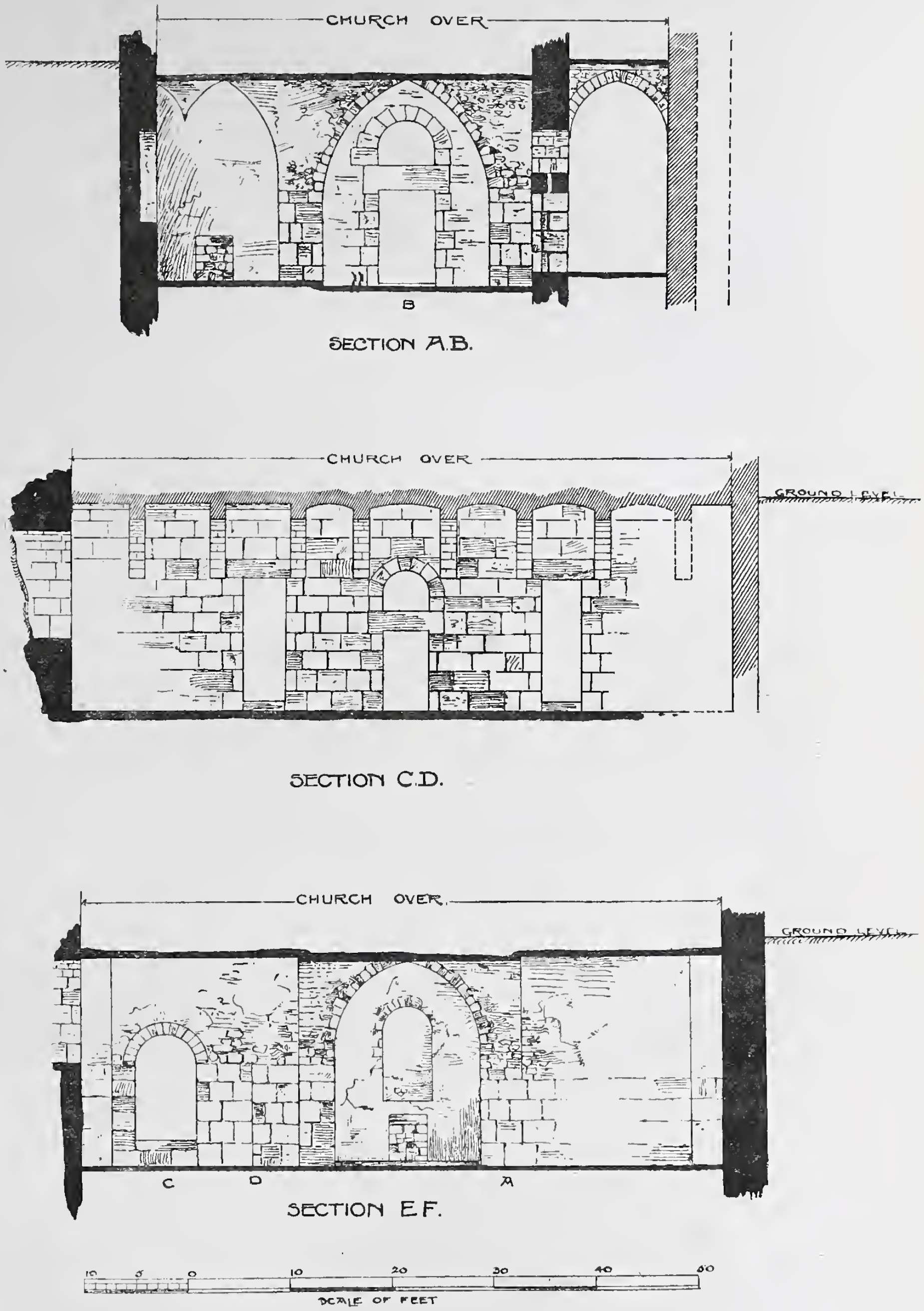


FIG. 6.—CHURCH OF ST. JOHN THE BAPTIST, JERUSALEM.
(Measured and drawn by Arch. C. Dickie, 1897.)

A close examination of this vaulting convinces me that it has been constructed in the same way as the natives construct the vaults at the present day—viz. by a rude centering of timber, brushwood, and earth, modelled to the form of the vault, and then completed in concrete of stones and lime thrown quickly over the centering and left to dry. The vaulting of the narthex is also late, and the ribs are irregularly spaced to suit the positions of the doorways then existing. Under the floor of the church is a crypt, which I was unable to explore. The whole plan and details are charmingly simple and effective. The proportions are pleasing, and give a dignity and greatness difficult to imagine in such a tiny structure, and it is a matter of regret that the remains of the west front lie hidden by a mass of *débris*, which in all probability will never be removed. The arrangement of plan is very similar to the tenth-century church of St. Elias at Thessalonica, as drawn and described by Texier and Pullan; but the four piers in the middle bay do not, even remotely, form a square, and it is doubtful whether they ever carried a dome, and suggest a tower treatment as seen in the small triapsidal churches in Normandy.

It seems difficult to believe, but it is none the less true, that the "jerry" builder has found his way even to Jerusalem. The influence of ancient tradition is, however, too strong to allow his cupidity a free course, and he must needs still build up to a certain massive standard for the sake of his honour—as he loves to call it. But for that, he might risk a good deal, and although he may not for some time attain such perfection as our local breed, he is steadily progressing towards that high state, and is naturally endowed with every quality essential to perfect success. Hitherto the Arab was conservative and stationary, loving the habits and works of his forefathers, and we have this to thank for what remains of ancient architecture there are still left to us. But he is growing restless, and there is no limit to the excesses which may be perpetrated; the value of property jumps up to a fabulous extent, and fortunes are made on a single deal. It is this which is responsible for the destruction of many most sacred relics. For fear of complications many valuable discoveries are secretly destroyed to make room for the houses of the new fancy, and the hand is at work which may in time turn Jerusalem into a speculative horror. All are not bad, however, and there is at least one man in the city who is fit for better things—an Arab Effendi, who, when excavating the foundations for a new house, came upon one of the most beautiful Byzantine floor mosaics yet discovered. He preserved it by building a cell on the old foundations, and transferred the site of the new house to another quarter.

The floor is that of a mortuary chapel, a tiny rectangular cell 21 feet by 13 feet, with an apse on the east end, evidently of the sixth century. The design is a most exquisite bit of colour, and consists of vine branches growing from a vase on the west end of the cell, formed into circular panels, within which are grapes and birds of almost every description and colour. I shall quote from Dr. Bliss's report on the discovery:—

> "The mosaic, which measures about 21 feet by 13, is surrounded by rude rubble walls, plastered on the inside, similar to the walls of the church we discovered on the Mount of Olives. At the east end there is a small apse. The building was founded on the rock, and the *débris* over the walls was hardly more than 3 feet deep. Under the south-west corner is a small natural cave, in which we found human bones, and lamps of the fifth and sixth centuries A.D. That the room is a mortuary chapel is also confirmed by the Armenian inscription, found at the east end, to the effect that the place was in memory of all those Armenians whose name the Lord knows.
>
> "The mosaic is a most elaborate piece of work, the stone tesseræ being of almost every colour. Within a border of the guilloche pattern we observe a vase, from which springs a vine ramifying into branches, on which hang grape-clusters; among the branches are numerous birds, peacocks, ducks, storks, pigeons, fowls, an eagle, a partridge, a parrot in a cage, etc."

Dr. Murray has furnished the following note on the mosaic:

"There is much that reminds me of a late classical spirit, such as we expect in the period between Constantine and Justinian (321–560 A.D.). The general design of a great plant or tree growing out of a vase recalls a mosaic from Carthage now in the British Museum, which can hardly be later than the early part of the sixth century, while, again, the birds enclosed among the branches remind one in a measure of the early Christian sarcophagi. . . . It is true that the habit of enclosing animal forms within circles formed by foliage was very frequent in Byzantine work, but equally it had been there derived from late classic times when drawing was far purer, and more like that of the new mosaic. The difficulty at present is to reconcile this view of an early date with the Armenian inscription, which forms apparently an original part of the mosaic."

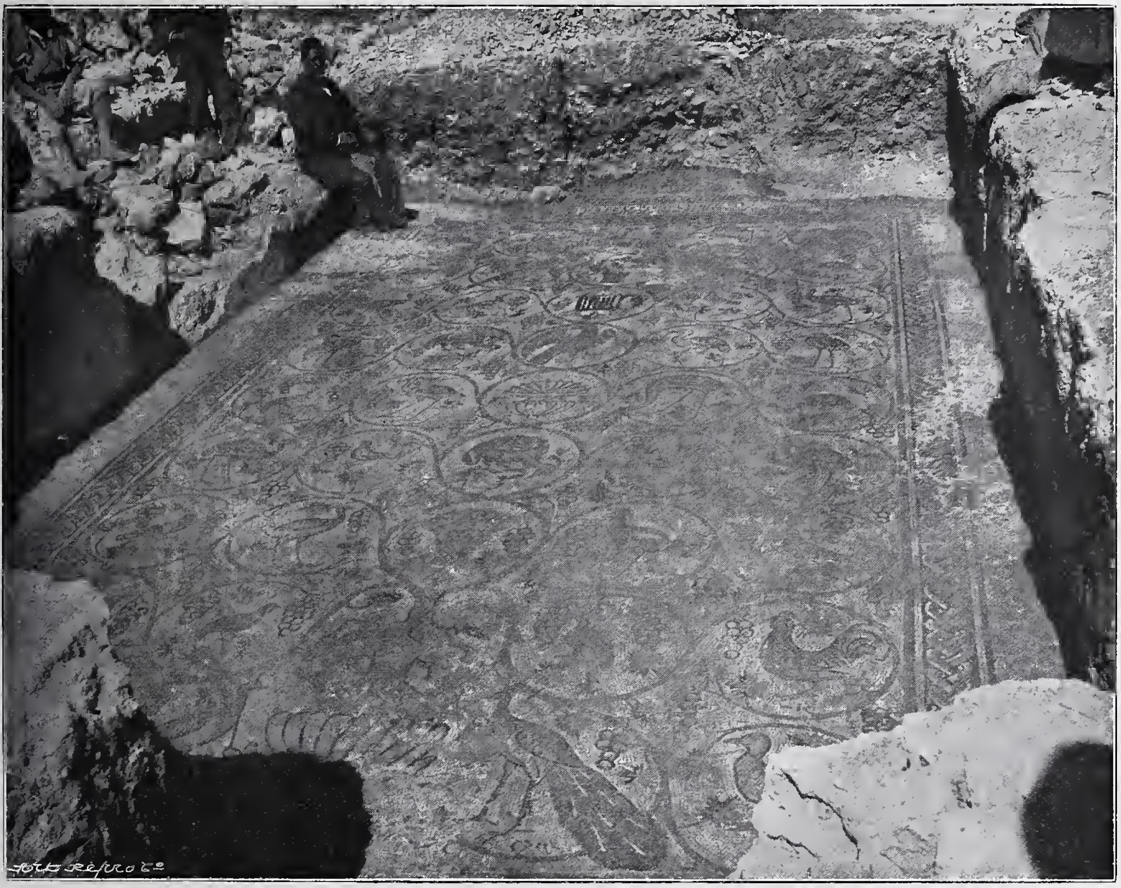


FIG. 7.—MOSAIC IN ARMENIAN MORTUARY CHAPEL, JERUSALEM.

Several mosaics of this class have recently been brought to light in Syria. At Madeba there are pavements of similar character. One consists of a design of trees growing from four angles with animals feeding on the branches; and another fragment outside a church—in which is a mosaic map of Palestine, in detail, of the sixth century—shows a like feeling. The excavations of the British School at Melos have laid bare an elaborate pavement of five panels within a treble border of wonderful beauty. Two of these panels recall the Palestine mosaics. One is filled by vine branches growing naturally from its four angles, with birds and beasts feeding from grape clusters. The design is less conventional, and the branches are not arranged in any particular form, thus lacking the spirit of design seen in the Jerusalem example. The other panel is circular, and contains fishes and a man in a boat, recalling in a remarkable manner the portion of the Madeba map mosaic which indicates the Dead Sea. The Melian mosaic has been published from drawings by Mr. Clark, and Mr. Bosanquet in his description writes :—

“ It is commonly said that in early Christian centuries the use of mosaic pavements diminished, and mosaic work was almost confined to walls and ceilings. Of late years, however, a surprising number of Christian mosaic pavements have been discovered in Syria and Palestine. Several of them have spreading vine patterns. The best known instance is the pavement of a church discovered by Renan's expedition, at Kabr Hiram, near Tyer, and transported to the Louvre. The general design recalls the ‘African Mosaics,’ published by Gauckler; four vines spring from vases placed in the corners of an oblong panel; their branches, however, are quite formally arranged, so as to encircle a series of medallions placed in rows of five across the design. An inscription fixes the date of the pavement, according to Renan's interpretation, at 575 A.D., in the reign of Justin II. Dr. Rossi ascribed the vine panel, on the ground of its style, to the fourth century, but later discoveries seem to confirm Renan's conclusion. In particular two mosaics of this type have been found at Jerusalem, one in the Mount of Olives in 1871, and the other outside the Damascus Gate in 1894. Both bear Armenian inscriptions, the former can be dated with comparative certainty to the middle of the sixth century.”

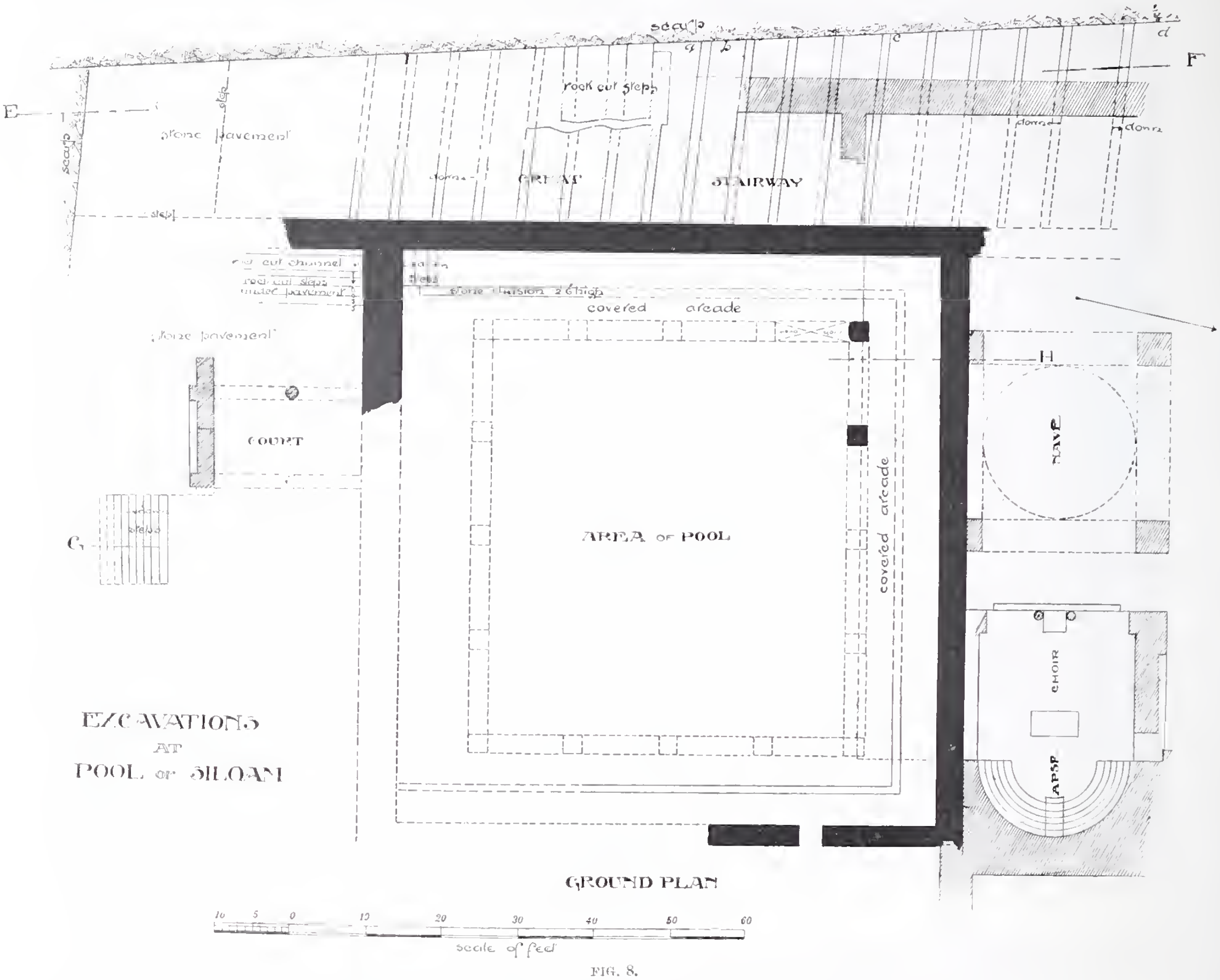
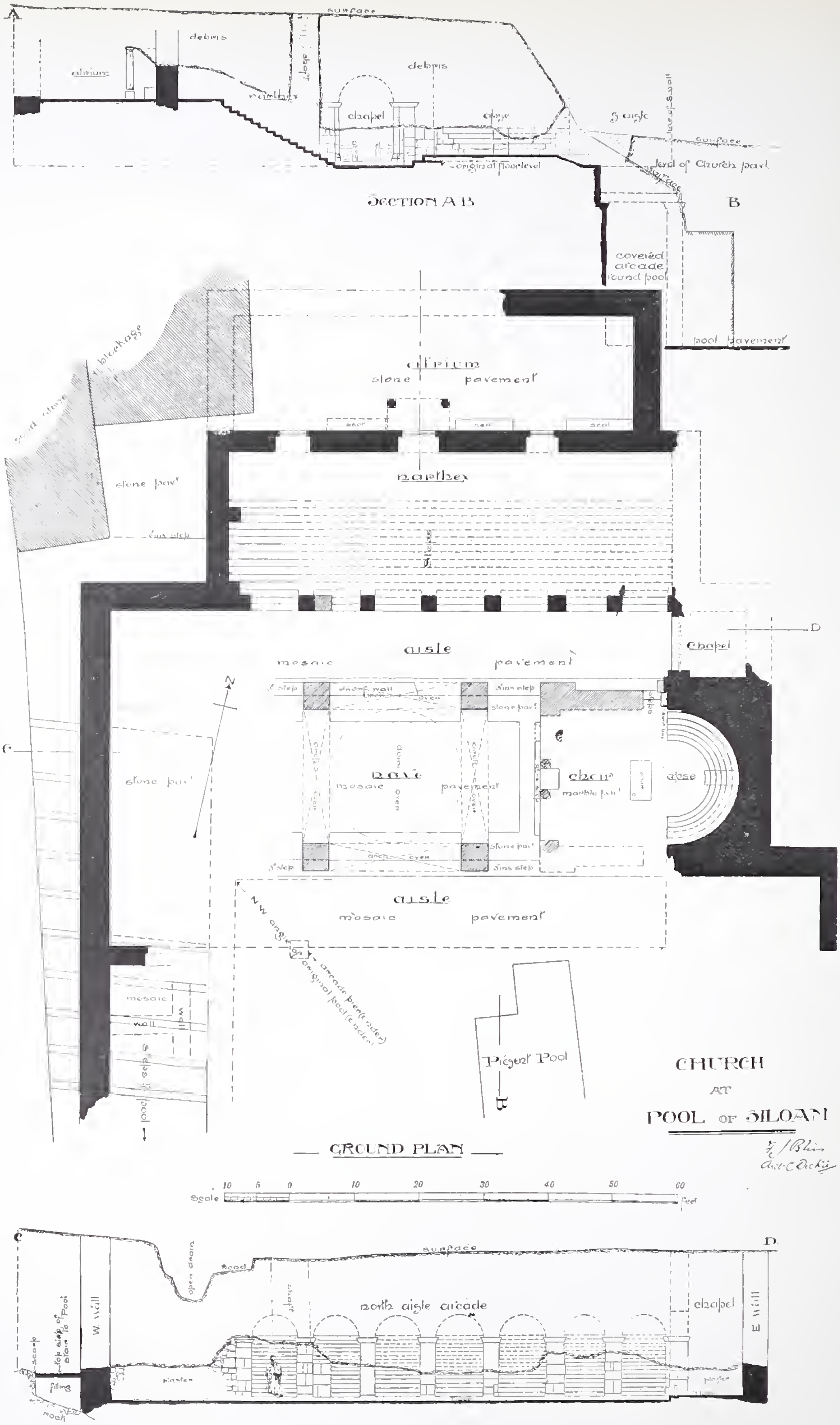


FIG. 8.

Next to the church of the Holy Sepulchre, perhaps the most interesting is the church dedicated to the waters of Siloam in the middle of the fifth century A.D. The discovery of this long lost ruin was made during the recent three years' excavations by the Palestine Exploration Fund under the direction of Dr. Bliss.

First, let me describe the Pool of Siloam, which was built many centuries before, and to which the church owes its existence. It lies outside the southern limit of the present city in the bed of the Tyropœon valley, just a little above its junction with the valley of the Kedron. On the east rises the hill of Ophel, on the northern heights of which is the site of the Temple, and on the west is the western hill, the summit of which is identified by some with Mount Zion. The recent explorations prove that the pool was enclosed within the ancient Jewish wall of Nehemiah, and the wall, where it crosses the valley at its junction with the Kedron valley, shows unmistakable evidence of having been utilised as a dam for a reservoir of considerable capacity, evidently the overflow from the pool. Now it is simply a sewage settling pond, which dries up towards the end of the summer, when the deposit is eagerly carried away to fertilise the stony terraces cultivated about the village. In the winter it is fed by the surface drainage of the surrounding hills and the one huge main drain of the city, keeping in a more or less liquid state until the month of September, when it becomes completely dried up. During the progress of evaporation it is anything but a pleasant or healthy locality to any one except the natives of Siloam, who seem to suffer no inconvenience whatever, and sun themselves about its banks even during its ripest state, and coax it into greater vitality by throwing great stones into it from the wall.

The excavation was commenced just to the north of this pool, and at a point 30 feet below the present surface was found the first of a flight of steps, 24 feet wide, extending northwards for a distance of 110 feet, at which point they ceased, but in all probability they originally continued to join the stepped and paved street of similar character which leads down the Tyropœon valley from the locality of the Temple area. This street lies 20 feet under the surface, formed of well-worked pavement, and on either side are the lower courses of the houses which once existed. Further excavations recovered the whole pool, 70 feet square, with a covered portico, part of which was excavated, and which, according to the pilgrim writers, existed round the four sides. The walls of the pool are partly cut in the rock and partly built, with well dressed and set ashlar, and capped by an inverted ogee moulded course, on which rest the stone covers of the portico, huge stone slabs, some measuring 10 feet square, at a height of 20 feet above the pool pavement, and 5 feet under the present surface of the ground. This wall stands almost complete round three sides, and in some parts looks as fresh as when it was built. Around three sides of the pool is a sort of seat or support, 13 inches thick by 3 feet high, in one stone in the height, and half rounded on the top, polished by long use. The steps and pavement are also polished by foot wear, so much so that some of the early pilgrim writers describe them as polished marble. Note the curious spacing of the treads; they rise 8 inches to 9 inches, and are alternately 1 foot 2 inches and 4 feet 9 inches broad. Underneath these are rude rock steps, evidently the stair to the earliest pool, which, in all probability, was a huge tank rudely cut out of the solid rock. These latter may be the work of Hezekiah, and the restoration may be either that of Herod the Great or Hadrian. The pool is supplied by an aqueduct from the virgins' fountain lying in the valley of the Kedron, to the east of Ophel, probably cut by Hezekiah in the eighth century B.C. The famous inscription discovered in its rock-cut wall, near the outlet, is dated by scholars about that period. It records the history of the aqueduct driven from both ends, and when the miners were yet three cubits apart, they could hear the voices of the other diggers: "for there was an excess in the rock on the right, they struck each to meet the



SECTION A B

CHURCH
AT
POOL OF SILOAM

F. J. Bliss
Arch. C. Dickie

GROUND PLAN

SECTION C D

FIG. 9.

other, pick to pick, and there flowed the waters from their outlet to the pool, a distance of 1,002 cubits. Of a cubit was the height of the rock over the heads of the excavators."

Up till the time of the Empress Eudocia in the middle of the fifth century A.D., there is no record of any building attached to the pool. This unfortunate empress, through some intrigue in the Byzantine Court, was banished by her jealous husband Theodosius, and her pilgrimage in Jerusalem lasted eleven years, during which time she built extensively, her most prominent works being the rebuilding of the city wall on the ancient line. The church of St. Stephen, to the north of the Damascus Gate, was also built by her, and has recently been restored by the Dominicans. The sacredness of the waters of Siloam to the ever-increasing throng of pilgrims who sought relief from their infirmities at its healing stream inspired her with the idea of building a place of worship over these waters. The existence of the Siloam tunnel was then unknown, and the waters were supposed to spring out of a cave which was in reality the outlet of the aqueduct of Hezekiah.

The plan adopted is unique. It consists of a nave and two aisles, measuring over all 86 feet by 52 feet. In the centre of the nave are four piers, 4 feet 3 inches square, the supports of the Byzantine dome of a later restoration. The projecting choir is also of the period of this later work, as well as the thickening of the pier in the entrance colonnade to the north, inserted evidently to provide for the extra thrust of the dome arches. There is no entrance in the west, and access is gained from the north by a great stair of sixteen steps, 68 feet wide, descending through an arcade of seven arches almost the whole length of the aisle. The staircase is reached by three doors, entering from an atrium, the centre doorway being accentuated by the addition of a small portico. Between the doorways occur low stone benches set against the wall, used as seats. It is quite evident that the four central piers and the choir are later additions when the dome was introduced, evidenced by a lower level floor and a low step 2 inches high, which runs down both sides under the choir and piers. These steps do not butt against the west wall, thereby suggesting their continuation across the west end; but on account of complications in the tunnelling which endangered the support of the overhead *débris*, we were unable to verify this. Assuming this theory to be correct, the colonnades would then have been continuous round three sides, similar to the early basilican arrangement. Ranged around the apse are five tiers of steps, with the centre raised at a higher elevation than the flanks for the seat of the bishop, as existing more or less complete at Torcello, illustrated by Fergusson. These steps are so small, however, 10 inches by 10 inches, that they look suspiciously like the retention of an architectural feature whose use had been ignored. There is a small chapel in the east end of the north aisle, screened by a low screen of red marble 2 inches thick, let into the sill and walls, and coped by a moulded coping which stops against moulded stone gate-posts in the centre, the remains of which were found lying at this point. Fragments exactly similar were found in the church at the Pool of Bethesda. The entire absence of any remains of the colonnade of the early basilica may be due to the destroying hands of the Persians 614 A.D., and the later restoration may be after this date; but there are arguments against this theory, notably that founded on the record of Antoninus Martyr, 560 A.D., who writes:—

> "Thence we came to an arch where there was an ancient gate of the town. In that place was the dirty water into which the prophet Jeremiah was thrown. Descending from that arch by many steps to the fountain of Siloam, we saw the vaulted basilica, from under which rises Siloam, which has two baths, made by the hands of man out of marble; between bath and bath runs a partition; in the one men, in the other women, bathe for a blessing. Many virtues are found in these waters, and even lepers are cleansed. Before the atrium is a large pool made by the hands of man, in which the (common) people bathe assiduously, for only at certain hours does the fountain pour forth much water,

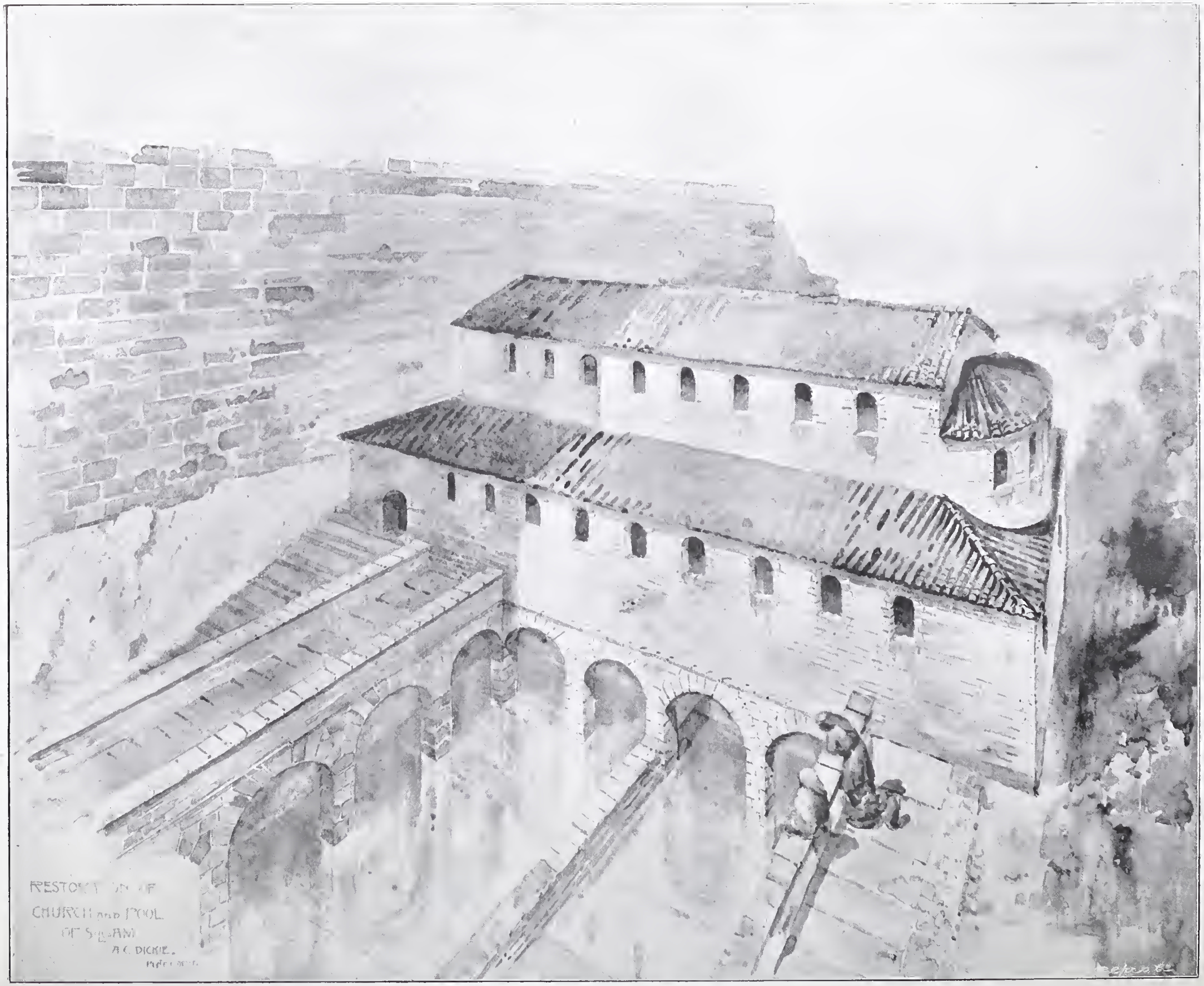

RESTORATION OF
CHURCH AND POOL
OF SILOAM
A.C. DICKIE.
ARCHITECT.

FIG. 10.

which runs down through the valley of Gethsemane, which is also called Josaphat, as far as the Jordan (entering the latter), at the place where it runs into the Dead Sea, below Sodom and Gomorrha."

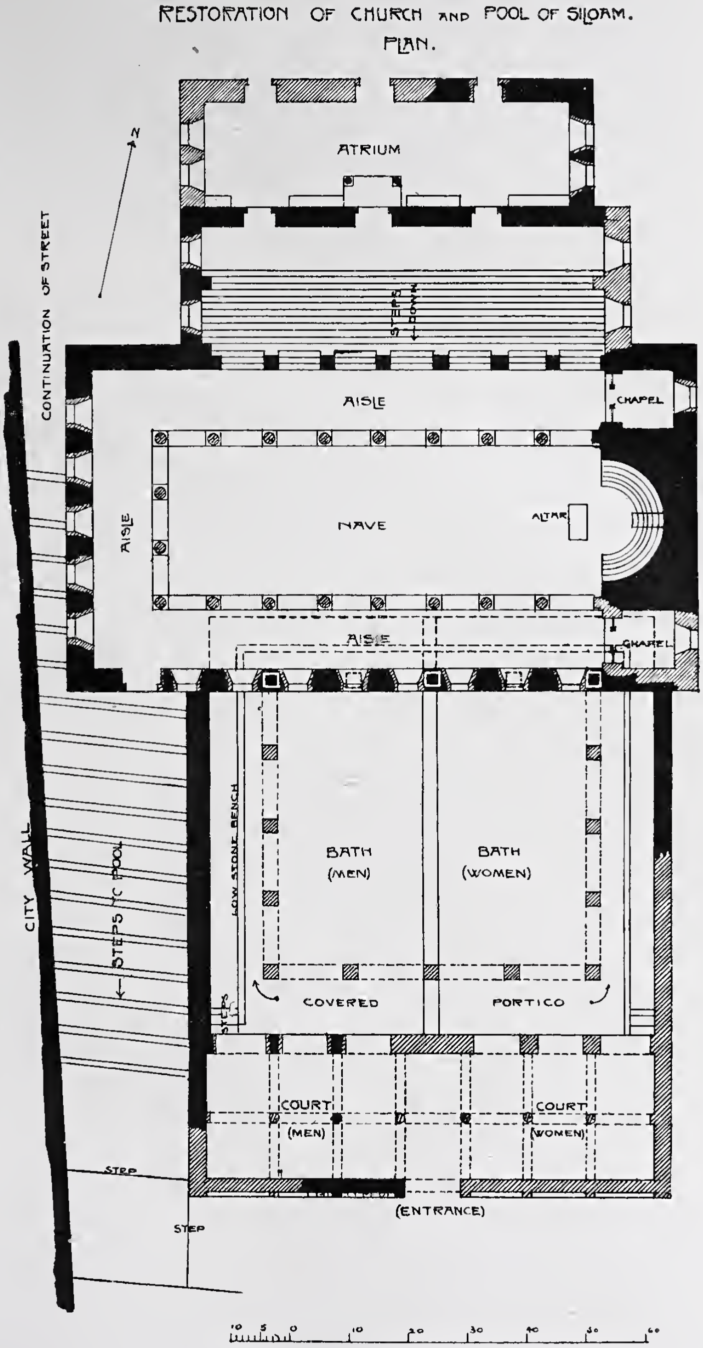


FIG. 11.

There is no evidence of *vaulting* in the original building, and on that account it is argued that his description refers to the dome, but as scholars dispute the translation of that particular word, little can be said. The atrium, in front of which the writer says "is a large pool in which the common people bathe," is probably the court to the south of the pool proper, the half of which was discovered as shown on the plan, and the pool of the common people would have been the overflow of the upper pool on the site of the present cesspool.

It will be interesting to consider the influences which worked together to bring about this peculiar plan, and to see with what success the designer has met the difficulties before him. The church, as has already been explained, was built to supply a place of worship for the pilgrims to the holy waters, and was designed to fit into an existing scheme in the building of which no such extension was contemplated. At that time the pool was believed to be supplied by a spring, the builders being ignorant of the existence of the Siloam tunnel. Antoninus Martyr, writing 560 A.D., says, "the church beneath which Siloa rises." The position of the supposed spring to which the church was dedicated, therefore fixed the position of the altar directly over the spot where the waters were believed to spring from, 27 feet below. This practically settled the eastern apse, and the west wall was fixed by the position of the rising scarp and city wall then existing, and forming the western butt of the great staircase, the necessity for incorporating the latter in the plan forcing the builders to draw the wall to within a few feet of the scarp, leaving a space only sufficient for a narrow passage and a western light to the church. It was desirable to have as much of the church as possible over the pool, and this was easily managed by carrying the south wall on the pool arcade and the aisle colonnade on the north wall of the pool. Thus the north was the only side available for the entrance to the church, and although the rapidly rising ground rendered this difficult, necessity demanded it, and the magnificent idea of a great staircase entering the north aisle through seven arches (almost its whole length) was the result. The traditional three doors were placed at the entrance to the staircase, and an atrium put in front, which in all likelihood was supplied by smaller doors, although we found no traces of them. Thus all the traditions of the early church plan were retained in a modified form—a most successful solution of an exceedingly difficult problem.

It is wonderful that so much of the walls are still standing. Although for the most part they were only seen to the height of the tunnels which were driven along their sides, at the points where shafts were sunk the masonry was found to a height of 8 to 9 feet, and it is possible that it exists even higher. We saw the westernmost pier of the entrance arcade up to the cap and springer, and the design of the arch mould can be got from the numerous voussoirs lying in the line of the arcade. One of the shafts of the central doorway of the staircase stands complete to the cap necking. The one capital discovered is a very rude imitation of a Corinthian cap. All the mouldings of the church are of a debased character, shallow imitations of classic forms, as rude in execution as they are weak in design. I shall quote from Mr. Crace's note in the *Quarterly Statement* with regard to these details:—

> "In these Siloam mouldings we recognise a certain attempt at repeating the time-honoured forms, but in a clumsy, cheap manner, with no regard for proportion or effect of light. The form of cross, too, cut in low relief in a stone slab, as well as the detached cross, are of a form characteristic of the same epoch. The poor, tamely-cut capital would seem to belong to the same period, and all justify the attribution of the work to Eudocia, who died A.D. 460."

It must be remembered that the fragments of details were only those which came in the way of the comparatively small area of the tunnels, for although in the whole excavation of the church and pool the distance traversed by the tunnels amounted to about 300 yards, the excavated area was a very small proportion of the whole. The difficulties of recovering such a plan were great in comparison with what would have been had it been possible to clear out the whole site. As it is the tunnels are now entirely filled up, and the ground shows no signs of what lies beneath its surface. An unsuccessful attempt was made to buy the site, with the intention of restoring the church and pool to their original state. At the time I gave the matter some thought, and I now show a sketch restoration [pp. 254, 255, 256] founded upon the theories which have been explained. When the existing remains have been fully studied it is wonderful how little remains to conjecture, as the buildings practically stand for a height of 35 feet from the pool pavement to the ruined top of the church walls.

One of the latest notices of the church is that by Felix Fabri, 1480–1483, at which time the church was in ruins. He writes: "When we came out of the Bathing Pool we followed the channel of the stream and came to the fountain of Siloam, where it runs out from Mount Zion. Now as we came up thither, walking up stream along the side of the brook, we wondered at the foul and loathsome colour of the water, but when we came to the fountain we discovered the cause of the dirty colour, for a Saracen, who was a tanner, stood at the mouth of the cleft from whence the water gushes forth, and was soaking, pounding with his feet, hides and skins lately stripped from the beasts." And further on: "And devout men built a sort of monastery about the fountain, as may be seen at this day, for in front of the fountain there is a pool like a bath, and it is set about with walls and vaults like the passages round a cloister, and the arches of the roofs rest upon marble columns. The building is partly in ruins, and the remains threaten to fall into ruins also. It would be an easy task to restore the ruins of the holy fountain, but no one touches them or puts forth his hand to them, and so the place grows day by day more ruinous, even as do the buildings in other holy places."

Since then no man has "put forth his hand to them," and they are now hidden deep beneath the fall of centuries. But they are yet there, perhaps not greatly changed, and could the site be cleared its appearance may be much as Felix Fabri saw it; aye, even to the tanner in the pool, as a tannery still stands on the hill, and during the few months of "high tide" the "Saracen" pounds his skins in the now fetid waters of Siloam, for Jerusalem is a waterless city, and he has but little choice.

NOTES ON MR. DICKIE'S PAPER.

On the motion of the Hon. Secretary, seconded by Mr. R. Phené Spiers [*F.*], a vote of thanks to Mr. Dickie for his Paper and illustrations was carried by acclamation.

Owing to a business discussion not contemplated when Mr. Dickie's Paper was arranged for, the Paper was not reached until a late hour, and when read there was no time for discussion. The President therefore invited members and visitors to put in writing any observations they would make upon the subject, and send them to the Secretary for insertion in the JOURNAL. The following have so far been received:—

From Mr. R. PHENÉ SPIERS [*F.*], F.S.A.

As the reading of Mr. Dickie's paper was not terminated till twenty minutes past ten, I felt it would be too late to commence a discussion, especially as some of the remarks which the paper has suggested to me are of a somewhat debatable character, and I propose now to defer for a second communication a portion of my statements, in order that there may be time to reproduce one or two additional illustrations. In Mr. Dickie's restoration of the Church at the Pool of Siloam, he shows on the north side a small chamber which he calls a chapel. As in the Greek Church there is only one chapel and one altar, the chamber in question was probably a recess set apart for the reception of the offerings of the faithful. In all the early Syrian churches, on either side of the choir are small chambers, generally with apsidal terminations. The one which is nearest to the main approach (sometimes on the north and sometimes on the south side) is the room for the offerings, which is screened off from the church only by a low enclosure screen similar to that shown on Mr. Dickie's plan. The other chamber on the south side contained the table on which the sacred elements were placed, and was entered by the priest only. These chambers do not serve the purpose of the prothesis and diaconicon, which for the purposes of the improved Greek ritual were introduced into all the Greek churches in the time of Justin II.

Mr. Dickie informs us that the small triapsal church was now surmounted by a modern church, to which he gave no name. If this triapsal church lies under a portion of the Church of St. Mary the Great, just restored for the German Emperor, may it not have been the Church of St. Mary the Less, which was built by the Monks of Amalfi about 1040? It does not seem to have been of sufficient importance to be the Church of St. John, which was built on the west side, I think, of the Church of St. Mary the Great.

As all the churches in Jerusalem were razed to the ground in 1010 by the Mad Khalif, El-Hakim, and thirty years afterwards two churches were built on this site, it may fairly be supposed that the one illustrated in Mr. Dickie's drawings is one of those, and is valuable therefore as showing the style of building erected in Jerusalem before the occupation of that city by the Crusaders. If so, it shows that the arches employed were all semicircular and not pointed. Further, in the Church of the Holy Sepulchre, the rotunda, built by Monomachus, was shown by Willis to have had semicircular arches throughout in its design. A drawing of this rotunda is given in his work, taken from the drawings of Bernardino. It follows, therefore, that the pointed arch was not necessarily current in Syrian work prior to the Crusaders. In my next communication I shall endeavour to prove the error of that long-cherished belief that pointed architecture was brought from the East by the Crusaders. It was introduced from Europe into Syria, and Mr. Dickie's remark "that the strong Provençal smack" about the Church of the Holy Sepulchre "betrays the inspiration of its design" is quite in accord with my recollection of the church and of its ornamental and constructive details.

From Mr. J. D. Crace [*H.A.*]

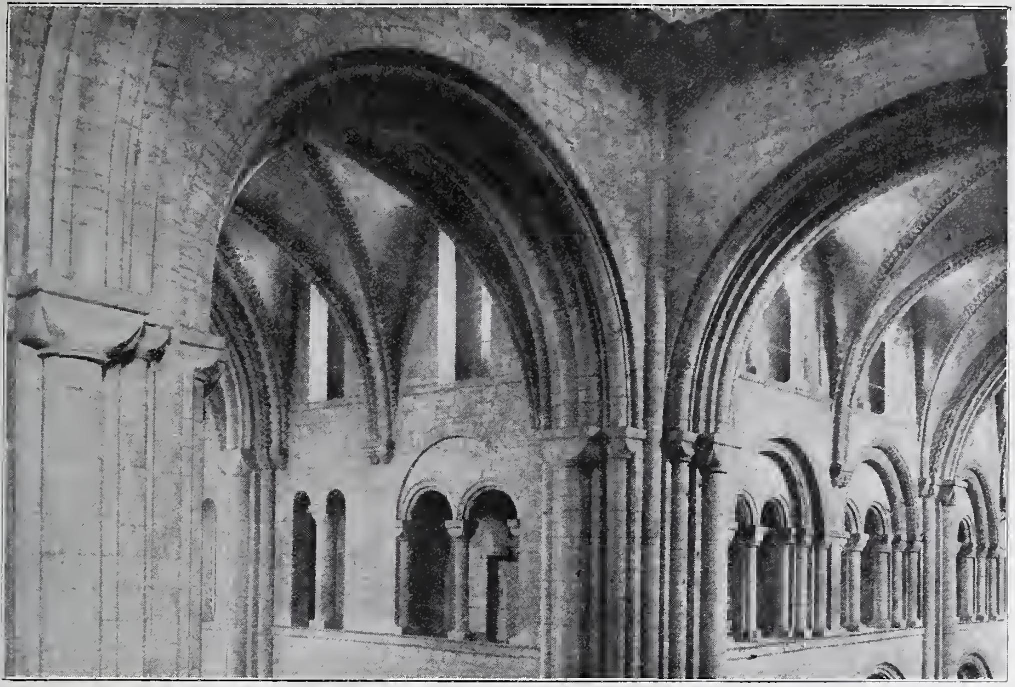
It is greatly to be regretted that the reading of Mr. Dickie's paper was delayed to so late an hour that discussion was not possible. Some service the paper will have done to both the Institute and the Palestine Exploration Fund. To the first in bringing home to architects the fact that there are innumerable remains of Christian buildings of periods both before and after the Mohammedan conquest; and to the second in showing architects with what care the Fund is endeavouring to record all that is discoverable. Architects as a rule have not, neither have the public generally, an idea of the vast number of remains of the churches and castles of the Crusading occupation, and these, no less than the earlier buildings, afford many interesting links in the history of architecture. In fact, Palestine should be an excellent "playground" for architects now that it is so easily accessible.

With regard to the mosaic floors of which Mr. Dickie gave some illustrations, it is worth while to note that the pavement of the mortuary chapel with the vine scroll, in which each volute contains some different bird, considerably resembles the mosaic decoration of a small dome in the Church of S. Vitale at Ravenna, a work believed to be of the sixth century; whilst there is also a decoration of somewhat similar treatment in the roof of the well-known "Baptistery of S. Costanza," close to Rome, a work supposed to be of the first half of the fourth century.

I agree with Mr. Dickie in thinking the other design, which is divided into rather compact panels by bands of Guilloche ornament (from the Mount of Olives), to be the earlier pavement. It is at least more purely Roman: perhaps second or third century.

A point of a very different kind may be noticed in connection with the discovery of the "Siloam" church. It was pointed out that the church cut into the remarkable flight of steps, which may be of the time of Hezekiah, and which, from its width, as well as from its long and short treads, was doubtless intended for use by animals as well as by men. It will be noticed that these steps are, in plan, each inclined towards the scarp or wall. This appears to be a simple and excellent device for causing the descending passenger to tend always to the safe side of the scarp, and away from the outer precipitous drop.

I feel sure that members of the Institute will appreciate the zealous energy of Mr. Dickie and his co-explorer and chief, Dr. Bliss, if they reflect that, in the case of this church and pool of Siloam, as in numerous other instances, the whole plan and other particulars have had to be groped for by working like moles in narrow tunnels far below the surface, and driving through the mixed and often treacherous *débris* of the ruined structures themselves and of other superincumbent buildings—a very different sort of labour from that of measuring and planning remains which are visible from the surface. It is, however, by such methods alone that discovery of any importance can be made about a city which has passed through such terrible vicissitudes as Jerusalem.



Durham Cathedral, South Transept and Nave. (From a photograph by Mr. C. C. Hodges.)

THE BEGINNINGS OF GOTHIC ARCHITECTURE.

By John Bilson [*F.*], F.S.A.

I. REVIEW OF RECENT DISCUSSION.

SO much has been written on the question of the origin of Gothic architecture that any further discussion of the subject may well appear to many to be superfluous. The general lines of development by which the flat-ceiled basilica of Western Europe was transformed into the stone-vaulted Gothic church have been traced accurately enough, but there is still considerable difference of opinion as to the part which was played by individual districts in the earlier stages of this development. The recent investigations of French archæologists are certainly worthy of the serious attention of English students, who are still too much inclined to accept as final the judgments of earlier writers, such as Viollet-le-Duc, some of which have been found in the light of more recent inquiry to be untenable. The discussion of this question during the last few years is of special interest to us, for it has reached a stage where accurate knowledge of Norman * examples in England may, I venture to think, contribute materially to a correct conclusion on at least one aspect of the questions involved in the inquiry.

In 1885 M. Eugène Lefèvre-Pontalis presented to the *Ecole des Chartes* an essay on the rural churches of the diocese of Soissons. In *L'Art gothique* M. Louis Gonse adopted for the most part the views propounded in this essay. M. Lefèvre-Pontalis has since developed his essay into his fine work, *L'Architecture religieuse dans l'ancien diocèse de Soissons au XI^e et*

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* Objection has been taken to the use of the term "Norman" in this connection, but I shall use it as a convenient and generally accepted term (without attempting to defend its propriety), especially as the course of development which is the particular subject of the second part of this paper seems to be Norman rather than English. A similar excuse must serve for the use of the term "Transition," though the history of mediæval architecture is, of course, that of one long transition.

au XII^e siècle. The scientific analysis and complete illustrations of the churches of this important district which are embodied in his work are of extreme value to the student of early French Gothic architecture. The publication of the first part of this work was followed by a paper, entitled *La Transition*, by M. Anthyme Saint-Paul, in which that distinguished archæologist summarises what he had previously written in numerous scattered articles, and presents his reasons for differing from some of M. Lefèvre-Pontalis' conclusions. M. C. Enlart's work on the churches of Picardy excellently describes and illustrates the Romanesque and Transition monuments of the dioceses of Amiens and Boulogne, and contains his views on some of the questions under controversy. The whole discussion has been reviewed in a masterly paper by Herr Dehio, one of the authors of a work which has been justly described in this Journal as the best book on the general subject of mediæval architecture which has yet appeared. Herr Dehio's paper is well worth a full translation; but, in the absence of this, I have made free use of it here, for I venture to think that his general conclusions must in the main eventually win acceptance, even among the younger French school of inquirers. The second, third, and fourth parts of M. Lefèvre-Pontalis' work have been published since the appearance of the criticisms mentioned above.[*]

The definition of the essential elements in the transition from Romanesque to Gothic is common ground to all our inquirers. The pointed arch, to the introduction of which an exaggerated importance was formerly attributed, is now seen to be only one of the factors in the transformation, and not indeed the most important factor. The history of the transition is now recognised as the history of the successful attempt to cover with stone vaults the three-aisled church of the basilican type of plan. There is no longer any difference of opinion as to the elements which play the most important part in the transition. They are the ribbed vault, the pointed arch, and the flying buttress, and of the three the ribbed vault assumes the first place, both in point of time and importance.[†] In the present state of knowledge, there can be no doubt that, when once the importance of these three elements was realised, the school of the Ile-de-France fully deserves the credit of their rapid and marvellous development, and that it led the way to the glorious achievements of the complete Gothic idea. But the younger school of French archæologists, as represented by M. Lefèvre-Pontalis, is by no means satisfied with this. The exclusive credit of the discovery of the ribbed vault is claimed for the Ile-de-France.

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[*] The following are the principal works referred to, and where the author's name only is cited below the reference is to these works:—

L'Architecture religieuse dans l'ancien diocèse de Soissons au XI^e et au XII^e siècle, by Eugène Lefèvre-Pontalis, Paris, E. Plon, Nourrit et Cie; part i, 1894; part ii, 1896; part iii, 1897; part iv, 1897.

L'Art gothique, by Louis Gonse, Paris, Ancienne Maison Quantin.

La Transition, by Anthyme Saint-Paul, in the *Revue de l'Art chrétien*, Paris, 1894–5.

Monuments religieux de l'architecture romane et de transition dans la région picarde, by C. Enlart, published by the *Société des Antiquaires de Picardie*, Amiens and Paris, 1895.

Die Anfänge des gothischen Baustils; zur Kritik des gegenwärtigen Standes der Frage, by G. Dehio, in the *Repertorium für Kunstwissenschaft*, xix. Band, 3. Heft. Berlin and Stuttgart, W. Spemann, 1896.

I am indebted to Professor Baldwin Brown and other friends for assistance in translating Herr Dehio's paper. The references below to M. Anthyme Saint-Paul's and Herr Dehio's papers are to the pages of the reprints. Much of the substance of Herr Dehio's paper has since been embodied in *Die Kirchliche Baukunst des Abendlandes*, by G. Dehio and G. von Bezold, vol. ii., first part of chapter ii.

[†] E. Lefèvre-Pontalis, i. 57—"La croisée d'ogives est l'élément essentiel du style gothique. L'emploi systématique des arcs en tiers-point et des arcs-boutants ne fut que la conséquence de l'usage des voûtes de ce genre. En trouvant le moyen de reporter la poussée des voûtes sur quatre points donnés, l'architecte qui adopta le premier les nervures diagonales avait découvert en même temps le principe qui permit d'élever plus tard de vastes églises, à l'aide d'un système ingénieux d'arcs-boutants. Tout l'art gothique dérive de la croisée d'ogives comme un grain de blé qui contient en germe une riche moisson." So also Anthyme Saint-Paul, in *La Transition*, p. 6—"L'architecture gothique ou ogivale est la conséquence de la fusion, dans une même voûte, de la croisée d'ogives et de l'arc brisé, contre-boutés, quand il y a lieu, par l'arc-boutant." And G. Dehio, p. 3—"Wenn man auch von dem vollendeten System ganz richtig sagt, es werde constituirt durch die Trias: Kreuzrippen, Spitzbogen, Strebebogen, so sind diese Elemente unter sich doch nicht ganz gleichwerthig; das an erster Stelle genannte ist das erste und herrschende auch dem Range nach. Die frühesten Keime der gothischen Idee liegen beschlossen in der Geschichte des Kreuzrippengewölbes."

According to Quicherat and Viollet-le-Duc, the single elements of Gothic appeared separately in the different provinces, and were united and developed by the school of Paris. The theory of the initiative of the Parisian school has, however, been entirely disproved by later investigation. It has been clearly shown that, in the early years of the twelfth century, Paris was considerably behind the neighbouring provinces. At this time the church of the rich abbey of Saint-Germain des Prés was partly rebuilt, but its nave, which belongs to this period, was still flat-ceiled. The chapel of Saint-Aignan (in *la Cité*, to the north of the cathedral), which was built about 1120, has still only the unribbed vault.* The only ribbed vaults in Paris which are earlier than Saint-Denis are to be found in the ambulatory of Saint-Martin des Champs, but this work is connected with the school of Picardy rather than with other Parisian buildings.† According to the prevailing view, the school of the Ile-de-France takes the place which was formerly assigned to the school of Paris.

The first part of M. Lefèvre-Pontalis' work consists of an historical and archæological study, in two chapters (vi. and vii.) of which, going beyond the limits of his immediate subject, he discusses the general questions of the origins of Gothic. His conclusion is thus summed up in his own words:—"La nervure est une découverte essentiellement française. C'est sur le sol de l'Ile-de-France qu'elle fut soumise à des expériences décisives, avant de s'imposer aux écoles des autres provinces et à celles des pays étrangers." ‡ He considers Senlis to be approximately the geographical centre of the district in which the ribbed vault became the fundamental principle of Gothic art, and that it was in the valleys of the Seine, Oise, Aisne, Marne, and their affluents that this original art attained such a high degree of perfection. In this district he finds the embryons of the system inaugurated at Saint-Denis, which Viollet-le-Duc failed to recognise in this connection.§ The beginning of the movement is placed in the first years of the twelfth century. Everything analogous to it which is found in other provinces is explained as a borrowing from the Ile-de-France.

It is at this last point that Herr Dehio considers the error of the prevailing teaching to begin. He points out that the earliest known examples of the rib are spread over a wide extent of country: Quimperlé in Brittany, Poitiers, Saint-Gaudens, Saintes, Moissac, Saint-Guilhem-du-Désert, Saint-Gilles, and Saint-Victor, Marseilles, none of which are later than the first or second decades of the twelfth century, and some may possibly be of the end of the eleventh century. He considers that the chief obstacle to the theory of this "découverte essentiellement française" is the vaulted architecture of Lombardy. This architecture is not, as Dartein and others have made it, Carolingian, nor is Ruprich-Robert right in supposing that it exercised such strong influence on that of Normandy; but, on the other hand, he considers that M. Lefèvre-Pontalis errs quite as widely when he asserts "que l'emploi systématique de la nervure en Lombardie ne remonte pas au delà du second quart du XII^e siècle," and "Il suffit de comparer l'ornementation des églises lombardes voûtées sur croisées d'ogives avec celle des monuments religieux bâtis dans l'Ile-de-France au XII^e siècle, pour constater entre leurs motifs de sculpture une ressemblance vraiment frappante." ‖ The French origin of the Lombard vault system is not here expressed in so many words, but that it is taken for granted by M. Lefèvre-Pontalis is proved by his conclusion quoted above. This, says Herr Dehio, is indeed so bold—employing the most polite term—that any effort to prove the contrary is superfluous. As a fact, the beginning of the twelfth century is the latest limit which can be fixed for the establishment of the Lombard system, and we then find the ribbed vault employed more sagaciously and in greater dimensions than in any contemporary work in Gaul, while buttressing walls, similar in intention to the later French flying buttresses, are component parts of the structure. The Lombards were then just on the threshold of Gothic, though this threshold they did not actually cross. He thinks that there is nothing derogatory to the fame of the French in recognising that other sections of the Gallic people and other races had started before them toward the same goal, though this goal they did not actually reach.*

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* E. Lefèvre-Pontalis, i. 84. A. Saint-Paul, p. 9. The fact that the choir aisles of St. Bartholomew's, Smithfield, which was founded in 1123, are covered with unribbed vaults seems to indicate that London, like Paris, lagged behind in the adoption of the ribbed vault, for (as we shall see presently) the rib had been used in England thirty years previously.

† A. Saint-Paul, p. 11.

‡ E. Lefèvre-Pontalis, i. 96.

§ *Dictionnaire raisonné de l'architecture française*, ix. 503.

‖ E. Lefèvre-Pontalis, i. 59, 60.

M. Lefèvre-Pontalis traces the development of the ribbed vault in the Ile-de-France, from its first appearance in rudimentary examples which he attributes to the end of the eleventh century, to the south transept of Soissons, completed probably about 1185. For our present purpose, however, we are concerned only with those buildings which he considers to be earlier than Saint-Denis, the narthex of which was completed in 1140, and the choir in 1144. The few great churches built during this period have entirely disappeared. On the other hand, many smaller churches remain, which for the most part have only been recognised in this connection in recent times, and many of these present examples of the ribbed vault, the more or less primitive treatment of which shows that they are original.† Their precise dates are, however, generally a matter of conjecture. The eastern bay of the south aisle of Rhuis (Oise) has a ribbed vault, the rib section showing three rolls separated by fillets.‡ The tower of Auviller, near Clermont in the Beauvaisis, has a vault with chamfered diagonal ribs springing from corbels. M. Lefèvre-Pontalis describes these two small vaults as the first attempts in this part of France to transform the groined vault by reinforcing it with ribs, and from the character of their detail he assigns both to the end of the eleventh century. Herr Dehio's comment on these and other examples which M. Lefèvre-Pontalis dates in similar fashion is that this way of deciding age is very unsafe, especially for country churches, where the builders employed were more likely to be behind the times than advanced. He thinks that examples of this kind are not fitted to be foundation-stones for far-reaching deductions; but that, even if the conjecture is correct, nothing is gained by it for M. Lefèvre-Pontalis' theory, but only another proof is afforded that, before the beginning of the twelfth century, the rib was the common property of all districts which were occupied with the problem of vaulted construction. In these vaults the rib is merely a method of strengthening the groin; the plan and system remain otherwise unchanged. It is not so in the next example to be considered.

The ambulatory of the conventual church of Morienval (Oise) is considered by M. Lefèvre-Pontalis to be the starting-point of the systematic development of the ribbed vault. This ambulatory consists of a very narrow passage around a semicircular apse, vaulted in four bays, the two central bays being a little wider than the side bays. The piers which support the wall of the apse consist of three attached shafts, with a pilaster next the choir; they are of very light construction, and only one (the southernmost) remains unaltered. Three of the arches of the main arcade which are supported by these piers are pointed, and one is semicircular. The window arches have two orders moulded with large rolls, those of the two central bays being elliptical and those of the two (narrower) side bays semicircular. The little transverse arches are semicircular, very much stilted, and of chamfered section; their clear opening is only 1 foot 10½ inches. The diagonal ribs are moulded with a large roll, and are received by shafts, except on the apse piers, where they abut very awkwardly against the back of the arches.§ With regard to the date of this ambulatory, no documentary evidence whatever is available. There is a record of the translation of relics in 1122, but there is no necessary connection between this translation and the erection of the ambulatory. The date of the work has been the subject of lively controversy. M. Lefèvre-Pontalis, and following him M. Gonse, formerly assigned it to the last years of the eleventh century. In a paper written in 1893, M. Anthyme Saint-Paul pronounced in favour of a date not much earlier than 1120 nor much later than 1135;[*] in his later work (*La Transition*, p. 26) he would place it willingly at 1120, with some reluctance at 1115. M. Enlart, without ceasing to believe 1100 to be a likely date, is inclined to accept 1122 as equally probable.[†] In the first part of his work, M. Lefèvre-Pontalis brought the date down to 1110; in the second part, he reviews the whole discussion, and gives his reasons for assigning the ambulatory to a date between 1110 and 1120;[‡] but it is worthy of notice that, with the solitary exception of Bellefontaine, the dates of the examples which he cites in support of his opinion are not supported by any *certain* evidence. Herr Dehio's view is that Morienval is badly qualified as the foundation of a new architectural system, and the controversy is certainly a significant commentary on his remark, quoted above, as to the danger of dating these early efforts without other evidence than is afforded by the character of their details. Truly, as M. Régnier says, "c'est à Morienval, plus que partout ailleurs peut-être, qu'il faut se mettre en garde contre les entraînements de l'imagination."[§]

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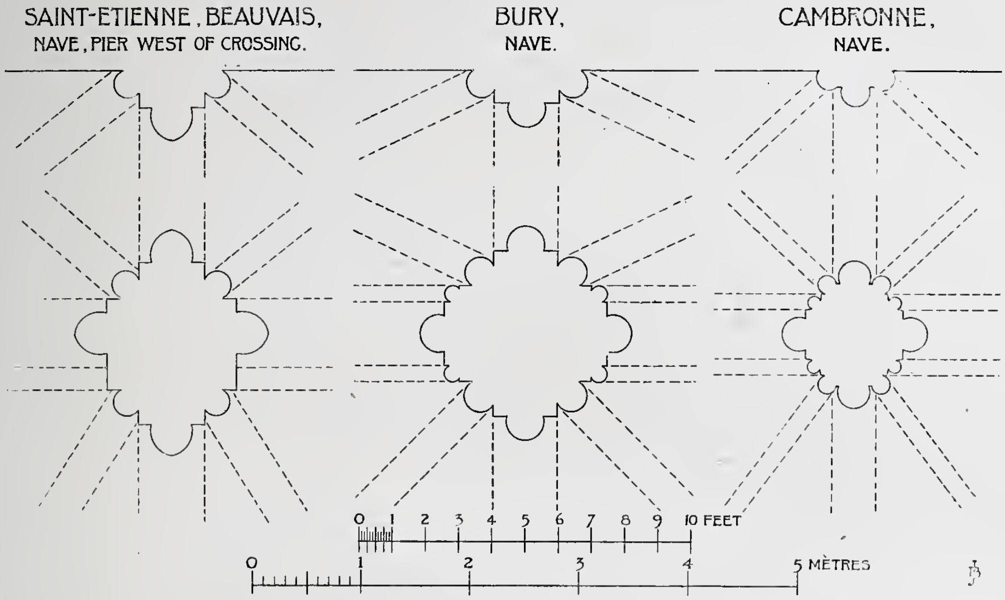
* G. Dehio, pp. 4, 5.

† G. Dehio, p. 5.

‡ E. Lefèvre-Pontalis, i. 72, 220, and pl. xii.

§ For plan of the ambulatory and other illustrations of Morienval, see E. Lefèvre-Pontalis, i. plates v.–ix.; also L. Gonse, pp. 55–57; and C. H. Moore, *Development and Character of Gothic Architecture*, pp. 34, 35.



The great abbey-church of Saint-Lucien, Beauvais, which was commenced about 1090 and finished in 1109, was unfortunately destroyed at the Revolution, and nothing definite is known about its vaults. This church, however, is regarded as the prototype of Saint-Etienne, Beauvais, which is attributed by M. Lefèvre-Pontalis to about 1120, and by M. Anthyme Saint-Paul to about 1115–1125. The vaults of the eastern bays of the nave aisles belong to the first building period. Each rib is supported by its own shaft (see plan).[‖]

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[*] *Poissy et Morienval*, by Anthyme Saint-Paul, in the *Mémoires de la Société historique et archéologique de Pontoise et du Vexin*, xvi. 7.

[†] C. Enlart, Introduction, p. iv.

[‡] E. Lefèvre-Pontalis, i. 74, 206. He remarks that the architects of the Valois did not work mouldings on their arcade arches before the twelfth century (p. 204). Such mouldings do, however, frequently occur in Norman work before the end of the eleventh.

[§] *Les origines de l'architecture gothique*, by Louis Régnier, in the *Mémoires de la Société historique et archéologique de Pontoise et du Vexin*, xvi. 127.

[‖] See view in L. Gonse, p. 59. Also *Archéologie des monuments religieux de l'ancien Beauvaisis pendant la métamorphose romane*, by E. J. Woillez, Paris, 1839; pl. vi. and vii.

The arcade arches and transverse arches are stilted semicircles, and the diagonal ribs appear to be nearly semicircular (possibly slightly elliptical). The transverse arches are chamfered in section, as also are the diagonal ribs in the easternmost bay; westward of this they are moulded with a large roll. The surfaces of the vault slope upwards at the crown towards the key of the diagonal ribs. There are no wall-ribs. The vault of the nave itself is attributed to the second half of the twelfth century; there are no flying buttresses or abutting arches, but only flat pilaster buttresses at the back of the triforium wall. M. Lefèvre-Pontalis remarks that the aisle vaults are much less crude in appearance than those of the ambulatory of Morienval, but this is true only of their technique, and not of their system, which is certainly less developed than that of Morienval. Herr Dehio points out the inconsistency of attributing the more advanced construction to an earlier date than the less developed, and, though not of course impossible, he thinks it very unlikely that Saint-Etienne, in a cathedral city, would be behind an out-of-the-way nunnery church like Morienval. He cannot but regard as demolished the efforts, received with so much applause, to put back the beginning of the Gothic movement to the beginning of the century. In itself it does not matter very much, he says, whether the transition lasted twenty, thirty, or more years; but it becomes of importance when it is necessary to decide the relation of the Ile-de-France to the neighbouring provinces.

M. Lefèvre-Pontalis shows that the new system of construction was matured in the smaller churches of the Beauvaisis and Soissonnais dating between Saint-Etienne, Beauvais, and Saint-Denis, and he supports this view by a large number of examples, which explain the rapidity with which a definite solution was arrived at. In the rural churches of the Soissonnais, as a rule, only the choirs and transepts are vaulted, the naves being still wood-ceiled. In the Beauvaisis, however, there are several early examples of vaulted naves and aisles. Plans of the piers of two of these are shown above. The nave of Cambronne-lès-Clermont is styled a simple imitation of Saint-Etienne, Beauvais, and assigned to 1125 at latest.* Bury is attributed by M. Gonse to about the same date.† In both these examples the arcade arches and transverse arches are pointed, and the vaults are without wall-ribs. With one exception, however, the dates assigned to these small churches are not supported by any positive authority. That exception, the chapel of Bellefontaine (Oise), is worthy of particular attention, not only in the matter of style, but as an authentically dated building, even if the date is not so absolutely certain as M. Lefèvre-Pontalis and M. Gonse declare. In 1125, Lisiard, bishop of Soissons, granted a charter to the abbey of Saint-Barthélemy, Noyon, authorising them to build a church here. On the strength of this charter, M. Lefèvre-Pontalis places the erection of the building between 1125 and 1130. M. Anthyme Saint-Paul and Herr Dehio point out that the document in question is a licence to build, and not necessarily the exact date of the actual construction; M. Enlart, indeed, attributes the work to about 1145, and is inclined to believe it to be later rather than earlier than this date.‡ The plan of this little church, which is partly ruined, shows a nave of one square bay, flanked by north and south aisles of two bays each, and a chancel of one square bay, flanked by aisles or chapels (of one bay each) which stop short of the east end of the chancel itself. The aisles of the nave are covered with ribbed vaults, the arcade arches and transverse arches being pointed and considerably stilted; the chancel is also covered with a ribbed vault, in which the key of the diagonal ribs is placed at a higher level than the apex of the chancel arch; none of these vaults have wall-ribs. The chancel aisles or chapels are covered with unribbed vaults, which are contemporary with the rest of the work.[*] All the windows have semicircular arches. M. Lefèvre-Pontalis' work contains descriptions and illustrations of many small churches of somewhat later date which present similar characteristics. To this group of churches of the Beauvaisis and Soissonnais he attributes exclusively the development which led up to Suger's great work at Saint-Denis.[†]

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* E. Lefèvre-Pontalis, i. 77. Cambronne is illustrated in Woillez (*op. cit.*), pl. iii. and iv.; and in R. J. Johnson's *Early French Architecture*, pl. 32 and 33.

† L. Gonse, p. 64, and illustrations on pp. 63 and 65.

‡ E. Lefèvre-Pontalis, i. 78; ii. 4; pl. xviii. and xix. A. Saint-Paul, p. 21. C. Enlart, Introduction, ii. note 2.

The ribbed vaults in these early examples are invariably quadripartite. Nowhere is there any approach to the sexpartite system.[‡] In his previous work[§] Herr Dehio grouped together a series of early Gothic churches, headed by Noyon which was commenced about 1152, which he designated as of the school of Saint-Denis, chiefly on the strength of a comparison of the plans of their choirs. The naves of these churches are characterised by triforium galleries and sexpartite vaults, and Herr Dehio suggests that they may also have derived these characteristics from Saint-Denis. However this may be, it is remarkable that, while we look in vain for any suggestion of these features in the churches of the Ile-de-France which M. Lefèvre-Pontalis describes as the first steps leading to Saint-Denis, we do find them as characteristic factors in the vaulted architecture of Normandy. M. Lefèvre-Pontalis, indeed, says that the ribbed vault was "une véritable importation dans l'architecture normande,"[‖] but this is pure assertion. Herr Dehio remarks that, although it is true that in many of the Norman churches the vaults have been added afterwards, there is no valid reason why they must have been added only after the middle of the twelfth century; besides which there are churches with original, though unfortunately not exactly dated, vaults. On such uncertain ground, he considers that the sexpartite method of vaulting (which M. Lefèvre-Pontalis passes over in silence) affords the surest indication of the real relation of the two schools. He points out that we find in Normandy, in addition to the usual form of the sexpartite vault,[¶] a similar but much less developed form, which is not really a sexpartite vault at all, but a quadripartite vault over a double bay divided by an intermediate transverse rib carrying a wall.[**] It is obvious that this method could not have been invented if the simple quadripartite vault had not already been known. For the development of these different varieties we must allow so much time that (even at the lowest estimate, and bearing in mind the date of Saint-Etienne, Beauvais) French influence on their beginning is out of the question, and M. Lefèvre-Pontalis' importation theory falls to the ground. Herr Dehio thinks that, as the whole series of churches to be taken into consideration, from Saint-Etienne, Beauvais, to Saint-Denis, show a marked borrowing from Normandy in respect of their form, there is considerable probability that they were influenced in their construction also.

M. Lefèvre-Pontalis' summary method of disposing of the evidence of the Norman vaults has not, however, been endorsed by some, at least, of his brother archæologists in France.[††]

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[*] Unribbed and ribbed vaults are also found together at Poissy, Saint-Martin des Champs, Paris, and Saint-Germer. The crypt of Suger's ambulatory at Saint-Denis has unribbed vaults and semicircular transverse arches.

[†] The earliest examples of the ribbed vault in the dioceses of Amiens and Boulogne, described by M. Enlart (pp. 51 and 132), are Airaines and Lucheux, both of which he assigns to the second quarter of the twelfth century. In both cases the transverse arches are pointed.

[‡] The single square bay of the nave of Bellefontaine is flanked by aisles of two bays, and M. Lefèvre-Pontalis (ii. 6) says that the architect "avait imaginé une disposition qui fut appliquée plus tard dans la nef de la cathédrale de Noyon." But the nave of Bellefontaine seems to have been covered with a quadripartite vault, and there is no suggestion of the sexpartite form.

[§] *Die Kirchliche Baukunst des Abendlandes*, by G. Dehio and G. von Bezold, i. 427.

[‖] E. Lefèvre-Pontalis, i. 89.

[¶] *L'Architecture normande aux XI^{e} et XII^{e} siècles en Normandie et en Angleterre*, by V. Ruprich-Robert. Saint-Etienne, Caen, nave (pl. 83 and 84); Creully, nave (pl. 87); Petit-Quevilly (pl. 88). *Cf.* Sainte-Trinité, Angers (*Die Kirchliche Baukunst*, pl. 108).

[**] *L'Architecture normande*, Sainte-Trinité, Caen, nave (pl. 74 and 75); Bernières-sur-Mer, nave (pl. 78); Saint-Gabriel, choir (pl. 80 and 81).

[††] *E.g.* M. Louis Régnier, in *Les origines de l'architecture gothique*:— . . . "Lorsque l'on examine les voûtes d'ogives qui existent . . . à Caen et aux environs de cette ville, comment expliquer que l'on ne trouve, dans les profils ou les supports de ces voûtes, rien qui rappelle les dispositions adoptées autour de Senlis? M. Lefèvre-Pontalis, c'est vrai, les attribue à l'année 1160; mais il ne donne et ne peut donner aucune preuve à l'appui de son opinion, toute de sentiment. Les voûtes normandes peuvent tout aussi bien remonter à 1130 qu'à 1160: leur date exacte est un problème dont nous n'avons pas encore la solution. En

M. Anthyme Saint-Paul, whose notable contributions to architectural archæology entitle his judgment to great weight, is convinced that, among the Norman vaults, there are some which are earlier than, or at least contemporary with, Saint-Denis, and he considers that the time has come when we must inquire whether Normandy must be associated with the transitional movement or not.[*] He admits a *double-courant,* from Picardy and from Normandy. That from Picardy, which embraces the group to which M. Lefèvre-Pontalis ascribes exclusive importance, adopted the pointed arch almost as soon as it began to use the ribbed vault. That from Normandy extended up the valley of the Seine, and has left behind the church of Poissy as its principal monument: it fully understood the value of the ribbed vault, but stopped short of the adoption of the pointed arch. Herr Dehio thinks that if, with M. Anthyme Saint-Paul, we go so far as to recognise not only the independent origin of the transitional movement in Normandy, but also its influence on Poissy, we must go still further, and admit that Norman influence extends to Saint-Denis, and there unites with the Picard stream. The influence of Poissy on the cathedral of Sens (commenced in 1140) seems to be generally admitted, so far as the choir is concerned,[†] and Herr Dehio thinks that the sexpartite vaults of the nave of Sens show the influence of Normandy—a point of some interest to us in view of the subsequent connection between Sens and Canterbury. The abbey church of Saint-Germer,[‡] too, suggests to him influence from Normandy rather than from Saint-Denis. His general conclusion, put forward with some reserve, is that Normandy developed the sexpartite vault and its abutment by triforium galleries, or occasionally by abutting arches concealed under the roof; that the school of the Ile-de-France first recognised the importance of the pointed arch as a means of adapting the ribbed vault to varying plans; and that at Saint-Denis the two lines of thought coalesced, from which time the precedence of the Ile-de-France was assured. From a low position among the schools of Gaul, it rose at once to the first.[§] Its former weakness was really an advantage, for it was less hampered by tradition, and had less to forget.[‖] It was favoured, too, by the circumstance that, after the comparative inactivity of the Romanesque

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présence de pareils faits, il n'est permis à personne de soutenir que les constructeurs de la Lombardie ou de la Normandie copièrent les églises du Beauvaisis et du Valois, en un mot qu'ils empruntèrent de toutes pièces la croisée d'ogives aux architectes de ces contrées. Plus juste et plus logique serait, à mon avis, le parti d'admettre que, dans chaque pays, il s'est trouvé des architectes habiles, préoccupés du souci constant de perfectionner leur art et capables enfin d'avoir trouvé à peu près simultanément le moyen d'augmenter l'étendue des voûtes." (*Mémoires de la Société historique et archéologique de Pontoise et du Vexin,* xvi. 119-120).

[*] As M. Anthyme Saint-Paul's opinion has such an important bearing on the subject of this paper, I quote at length the following passages from *La Transition* (cap. vi.):—"L'heure me semble venue de nous demander s'il faut, oui ou non, associer la Normandie au mouvement transitionnel. Nous l'en avions exclue, sur trois présomptions, il est vrai, défavorables: les plus anciennes voûtes à ogives y sont souvent des reprises postérieures; elles n'y admettent pas l'arc brisé; les églises gothiques du XII^e^ siècle, au lieu de dériver des traditions locales, y sont des importations françaises. Mais si les moyens ont été faibles et le résultat incomplet, s'ensuit-il qu'il n'y ait pas eu un effort intelligent et que cet effort n'ait pas aidé à l'effort général? Pourquoi donc la Normandie n'est-elle pas arrivée au port la première? Serait-ce pour avoir commencé trop tard? Ne serait-ce pas, au contraire, à cause de son obstination à repousser l'arc brisé, et n'y a-t-il pas là encore une preuve de l'impuissance où se fût trouvée l'ogive à constituer une architecture absolument nouvelle sans le concours du tiers-point? . . . . La Normandie a mis autant d'ardeur à adopter la nervure que le bassin de l'Oise à s'emparer de l'arc brisé; elle a excellé tout de suite dans le maniement de la croisée d'ogives, jusqu'à se faire un jeu des difficultés qu'il présentait. Enclin à multiplier les lignes dans les archivoltes, les jambages, les piliers, le Normand ne pouvait manquer de les ramifier dans les voûtes. De là les voûtes à huit divisions sur plan carré, comme celles de Saint-Romain (Rouen); de là les voûtes sexpartites, comme celles de Caen et de Creully; et, parmi ces voûtes, j'en suis convaincu, il en est d'antérieures à Saint-Denis ou tout au moins contemporaines. A plus forte raison seraient antérieures ou contemporaines les voûtes à croisées simples, comme celles de Montivilliers (croisillons), de Fontaine-Henri, de Lessay. Il y aurait eu ainsi, avant l'importation du style ogival rudimentaire, une phase sans connexion directe avec cette importation et durant laquelle la Normandie, spontanément, aurait fait un usage magistral de la nervure sans s'astreindre à lui joindre l'arc brisé."

[†] A. Saint-Paul, p. 29. L. Gonse, p. 82. E. Lefèvre-Pontalis, i. 84.

[‡] About 1140, according to M. Lefèvre-Pontalis (i. 85); not earlier than 1150, according to M. Anthyme Saint-Paul (p. 42).

[§] "L'école française n'existe bien clairement que comme école gothique; une des plus faibles vers 1120 ou 1130, elle devient bientôt après la plus importante de toutes." *Histoire monumentale de la France,* by Anthyme Saint-Paul, 4th ed., 1895, p. 124.

[‖] *Cf.* Sir G. G. Scott's *Lectures on Mediæval Architecture,* i. 125.

period, architectural undertakings of considerable importance crowded fast upon one another. Normandy, on the other hand, did not reach a complete early Gothic style, but she had fully answered certain definite prior questions, which indeed, as it happened, benefited the neighbouring French school much more than herself. The importance to architectural history of these answers is not on that account to be less highly estimated.*

According to M. Lefèvre-Pontalis' theory, Anjou† and Burgundy, as well as Normandy, derived the ribbed vault from the Ile-de-France. Herr Dehio's criticism of this view may be briefly summarised here. He attaches special importance to the cathedral of Saint-Maurice, Angers. This is lightly dismissed by the writers of the Ile-de-France school as being nine years later than Saint-Denis. It is true that the vaults of Saint-Maurice were begun between 1150 and 1153, but the form of the supporting piers and walls proves that they were planned from the first. In view of the colossal dimensions of the building, the beginning of its construction must be put back eight or ten years at the least; that is to say, the master of Saint-Maurice might just have managed to know the narthex and choir of Saint-Denis, but not the nave, which was erected after 1144. After analysing the construction of Saint-Maurice, Herr Dehio says " the fundamental idea of the Gothic system, the separation between parts which are structurally effective and parts which are mere screens, is here thought out with absolute clearness, and carried into execution with a boldness equally great—the span of the vault is more than 16^{m} " (about 54 feet). Apart, however, from this fundamental idea, everything in Saint-Maurice is different from Saint-Denis, " and the notion that the scheme of Saint-Maurice was derived from Saint-Denis is so absurd that it would be a waste of words to say anything more about it." There was, in fact, an independent development of the rib-construction in the district of which Angers is the centre, and Saint-Maurice and Saint-Denis should be placed side by side as the first two Gothic monuments.‡

After a word on the importance of the cathedral of Chartres, where the southern tower was rib-vaulted in 1134 and the northern in 1145—which evinced its artistic priority over Saint-Denis by lending to it sculptors out of its workships—Herr Dehio concludes with a note on the architecture of Burgundy. This district had, like Normandy, done great things in the late Romanesque period, and was familiar with the basilican plan, and with constructive elements such as the pointed arch and barrel and groined vaults. The principal builders in the twelfth century were the rival orders of Cluny and Citeaux, the former adhering to the older traditions, while the Cistercians began the early Gothic movement in this district. The oldest known example of this is the abbey church of Pontigny, built soon after 1150. It is possible that there here really was (what we must deny in the Norman and Angevin schools) influence imported from the Ile-de-France, but in that case it can only have affected the most general elementary ideas, since in the hands of the Burgundian Cistercians it assumed quite a peculiar form. The Cistercians attended to the logic of construction rather than to more artistic features, and the ascetic tendency in their work checked the free development of the style. Otherwise Burgundy, with its great architectural endowments, would have exercised more influence on the development of Gothic in France than was actually the case.

In his conclusion, Herr Dehio thus summarises the difference between the ruling theory and his own :—

" According to the former, the Ile-de-France has the sole and solitary claim to be called the

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[*] G. Dehio, p. 11.

[†] Of Anjou M. Lefèvre-Pontalis says—" La croisée d'ogives était utilisée dans la région parisienne depuis un demi-siècle, quand elle fut importée en Anjou. Les voûtes qui caractérisent le style Plantagenet ne représentent donc pas un acheminement vers l'arc ogive : elles sont au contraire l'émanation directe des voûtes gothiques bâties dans la région parisienne au début du XII^{e} siècle. La nervure se transforma dans les églises de l'Anjou et du Poitou, par suite de l'influence locale de la coupole, mais elle y a gardé néanmoins l'empreinte de son pays d'origine " (i. 65).

[‡] M. E. Corroyer's theory that the ribbed vaults of the Ile-de-France were derived from the domical vaults of Aquitaine is, of course, quite erroneous.

cradle of Gothic; already in the first decades of the twelfth century it was the teacher of the neighbouring provinces in the systematic use of ribbed vaults, and all that presents any analogy to Gothic in these provinces was merely an echo of the art originating in the Parisian district. On the other hand, according to my theory," he says, "the sources of Gothic were more widely spread, from Normandy and Anjou to north Burgundy; there was no centre dominating the whole area; certain mutual influences existed between the single schools, though independence of execution was the rule; extraordinarily simultaneous was the appearance of the first clearly defined master buildings of Saint-Denis, Sens, Chartres, and, a little later, Pontigny; after the middle of the century there was closer cohesion between Normandy, with the district between the Seine and the Loire, and the Ile-de-France; but, on the western and eastern wings, the Angevin and Burgundian schools were completely independent until the beginning of the thirteenth century. At that date there really appeared for the first time what the doctrine I am combating declares to have been the case from the beginning—centralisation under French leadership. In fact the historical phenomenon of Gothic would have had something accidental about it if its basis had been as narrow as is supposed, and if its to-be-or-not-to-be had depended from the beginning only on that single school. We can well imagine to ourselves that under different circumstances Gothic might have taken another form, but that it could have failed to appear at all is inconceivable. Moreover, it only came to full perfection in those parts of France where it was preceded by an indigenous early Gothic movement."

In summarising this discussion, I have quoted Herr Dehio's views at greater length than those of the French writers, partly because his work is less accessible to English students, but chiefly because he endeavours to fix the exact relation of the Norman school to that of the Ile-de-France with greater precision than do the French inquirers, with the exception of M. Anthyme Saint-Paul; and even he scarcely goes as far as Herr Dehio in this direction. It is clear, from what has been already said, that a certain conclusion on this point would be greatly facilitated if exact dates could be assigned to the earliest examples of the ribbed vault in Normandy itself. Unfortunately this does not appear to be possible. It does not seem to have occurred to any of the writers on this question that the works of the Normans in England might possibly contribute something to a definite solution of the problem. M. Lefèvre-Pontalis does indeed refer to them, but he asserts that the ribbed vault was not adopted in England until its employment was general in the west of France.* His opinions on this subject, however, need not detain us here, for they appear to be based, not on an examination of the buildings themselves,† but rather on the conclusions of M. Félix de Verneilh, to which I shall have occasion to refer presently. It would be strange indeed if some light were not thrown on this question by the Norman churches in England, considering their great size and importance, and the marvellous building activity of what we are accustomed to call the Norman period. It is true that, within some twenty or thirty years after the Conquest, certain individual characteristics appear, some of which we are justified in attributing to pre-Conquest building traditions, and that consequently in some cases we find a less strictly logical adherence to one type, both in plan and construction, than is usual in Normandy. But such is by no means invariably the case, and in respect of structure the evidence afforded by some of the English churches is of the greatest possible value in such an inquiry as this, especially as their dates can in a few instances be fixed with absolute certainty. It appears to me, therefore, that an attempt may be made with advantage to trace systematically the history of Norman vaulted construction in England, so far as the surviving evidence permits. Such an attempt I shall venture to make in the second part of this paper, dealing for the most part with examples which can be exactly dated, and with analogous examples which illustrate the same tendencies. Although I must necessarily traverse what is to some extent familiar ground, still, so far as I know, no systematic effort has hitherto been made to treat Norman work in England from this very important point of view.* I ought, perhaps, to say that I have not the least sympathy with the attempts which have been made to claim an English origin for Gothic architecture; † such a claim entirely ignores the elementary conditions of the problem. From the building of Saint-Denis onwards, there can be no question as to the pre-eminence of the early French Gothic school. But the history of Norman architecture in England proves conclusively its complete independence of the school of the Ile-de-France, and goes far to confirm the view that the Norman school had no small influence on the beginnings of the French Transition.

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* E. Lefèvre-Pontalis, i. 89.

† It is difficult to account for the following passages on any other assumption—"La nervure apparaît seulement au-dessus du chœur de ce dernier édifice (Winchester), mais les voûtes de la nef ne furent établies qu'à la fin du XIIe siècle" (i. 89, 90). Speaking of the pointed arch, he says—"Guillaume de Sens, maître de l'œuvre de la cathédrale de Cantorbéry, en fit un usage systématique; mais le plein cintre règne encore sans partage dans les cathédrales de Winchester, d'Ely, de Rochester et d'Oxford, qui appartiennent à la même période" (i. 103).

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* The full significance of Durham in this connection is missed by Dehio and von Bezold, owing to their ignoring the vaults of the choir aisles and transepts, and adopting Billings's mistaken dating of the nave vault (*Die Kirchliche Baukunst*, p. 416). It is very strange that Durham is barely mentioned in Ruprich-Robert's *L'Architecture normande*, though he claims to deal with English as well as Continental examples.

† Such as Sir J. H. Parker's paper, *On the English Origin of Gothic Architecture*, *Archæologia*, xliii. 73.

HASKINISED WOOD.

By Frank Caws [*F.*].

SURELY the world is full and overfull of marvels, to which too many of us who ought to be open-eyed are blind. Two days ago I knew no more of Haskinised wood than a babe unborn. I had large practical experience of Kyanised wood, and of creosoted timber; and in the non-flammable wood which the American Admiralty now employ (with that shrewd common sense so characteristic of their race) for the fittings of their warships I have been feeling a growing interest, and picking up piecemeal such information as comes casually drifting along. Representatives of this industry have occasionally looked in upon me, and have always left me with a too general impression that, though non-flammable wood will be put upon the British market, it is as yet not quite a marketable commodity. And while I have been waiting for promised further information about this non-flammable wood, but vainly waiting thus far, two nights ago a friend called on me to ask if I would accompany him to Newcastle Central Station Hotel on the following Saturday to see Colonel Haskin? "And pray, who and what is Colonel Haskin?" "Oh! hadn't I heard of his wonderful process of wood preservation?" "No, I hadn't; unless he were the non-flammable wood man—in which case I should be only too glad to meet him, as I was keen for particulars of the non-flammable process." "Well, no, Colonel Haskin was not that man at all. He was a sort of wood cooker, who did marvels by means of superheated steam, or something of the kind, which my friend, to whom also the whole thing was new, did not feel able to explain in detail. But he had seen the woods which had been treated, and felt sure it would interest me to see them myself, and meet Colonel Haskin; and he would doubtless tell me all about it."

Well, one has had many new things put before one in one's office. As every architect knows, it is one of the privileges (?) of having an office, to find oneself a confidant of hopeful inventors in the building and allied trades, and one's office a common receptable for bricks and stones, and patent ventilators, and catalogues and prospectuses galore. Beautifully bound and got up volumes, many of them; but one's time and office space are sadly too limited to accommodate a tithe of the untold treasures of art and of inventive talent that are poured in such unstinted measure at one's feet. Even the returned strainers of disappointing competitions, which make such a cemetery of monuments in the garrets and retired corners of one's offices—monuments of one's wasted energies—even these phalanxes of returned strainers are scarcely so greedy of space, and of dust, as all the specimens of art and manufacture "brought from under every star, and blown from over every main," which afflict the sight and soul of that good-natured lover of neatness, your old-established country architect.

And now, upon top of all this, comes a request for one to leave one's stacks of strainers, and one's heaps of bricks and stones, and one's small nursery of patent ventilators, and sally forth to meet an American colonel, a real live inventor, and his blocks and slabs of mummified wood. Really it all seems farcical, this eternal procession of inventions and inventors, and wearying to the mind. But, seeing it would please my friend, I said that for once in my life I would go out of my way, and actually travel to Newcastle to meet this great wood-cooker, this founder of Haskinating (whatever that might be!), and see and hear all he could show and tell me. And so I went.

Before setting forth, I read in that morning's Newcastle paper a report on Haskinisation, by Mr. Vaughan, of Vaughan & Dymond, Engineers, Newcastle. This report gave me a more intelligent notion of the process than I had previously gathered from my friend, but still left many points to clear up.

I found Mr. Vaughan with Colonel Haskin, and I told him at once I had read his report, and there was one part of it which was in accord with a belief I myself once held, but of which a little bit of practical experience many years ago had finally disabused my mind. Mr. Vaughan's report stated that the creosote oil did not, in the creosoted timber, penetrate as a rule more than about half an inch beneath the skin. Any one would think so on looking at the end of a balk of cresoted timber where sawn through; for a black ring, of about half an inch round the outside, enclosed an area of sawn wood as clean and apparently innocent of impregnating oil as though it were fresh cut from the forest. But I on one occasion made some wedges out of the clean heart-wood of Baltic timber which had thus in the balk been creosoted. There was no show of creosote on these wedges when they were cut. But when they were driven by screw-jacks into their assigned places in the engineering work I was busy with, they sweated profusely *black blood*. The fact thus appeared that, though apparently innocent of oil, they were thoroughly impregnated. But as the oxygenising of the oil gives it its black colour, and as the oil in the heart-wood was remote from the access of oxygen, it was colourless till, on exuding under the very severe pressure to which these wedges were subjected, it turned black where the oxygen met it. Mr. Vaughan offering no rejoinder to this statement, I turned to Col. Haskin, and remarked that I, in my lifelong wish to see fireproof building generally adopted, felt a special interest in what I had heard of non-flammable wood. I should not have been surprised had the Colonel treated this remark as a *challenge*; and it would only have been natural had he forthwith proceeded to inveigh against a system of treatment of timber which I had thus put forward as potentially preferable to his own. But, far from seeking to decry by word or gesture the non-flammable method, the Colonel made me at once feel that he had nothing to urge against it, and quite sympathised with the interest I felt in it. His fairness of attitude towards what appeared to me a rival system at once predisposed me to give an unbiassed hearing to the explanation of his own system, which he now, as he courteously invited me to a seat, proceeded to give in reply to my questions.

The difficulty in such explanations often is to know how and where to begin, and I cannot remember exactly where my many questions began; but certainly the Colonel answered them very carefully and clearly, patiently labouring to clear the path for me, and I soon began to feel I was conversing with a delightfully ingenuous and thoroughly informed teacher, whose statements were absolutely untinctured by egoism or exaggeration; and very soon I found myself enthralled by his interpretations of Nature's processes of growth and development, the truth of which was as perfectly obvious as new to me. He said that in his younger days, when he was at some creosoting timber establishment in America, he was greatly struck with the quantities of fluid which were withdrawn from the timber when the vacuum was produced in the cylinders, previous to forcing in the impregnating oil. And he had taken quantities of this wasted sappy fluid home with him frequently at night, and experimented with and studied it, having from the first an idea that, if it were retained in the timber and properly dealt with, it would form a means of preservation rather than a cause of decay.

For Nature herself had taught him, by her example, a method of incorporating the tree juices and gums with the more solid fibre, and retaining them in a permanent compact of homogeneity. "You see," continued the Colonel, "the sap which rises from the earth into the tree never returns into the ground again. It flows into the space between the bark and the outer surface of the trunk, and is, while held there, acted upon by the heat, which would cause it to expand, while the bark binds it in and compresses it; and this process of heating and compression solidifies it by slow degrees, binding it to the new ring of fibre which each year's growth adds to the trunk." And then he went on to show that his patented process is likewise one of applying heat and pressure until the gums and juices of the tree are reduced from their plastic or semi-fluid to a solid state. I asked, "But what becomes of the *water* in the tree? You cannot convert that into a permanent solid, can you?" "I am glad," said Colonel Haskin, "that you have raised that point. Perhaps the best illustration I can give you of the result, so far as the water is concerned, is what happens to the water in an egg, when boiled hard. You know there is a very large percentage of water in an egg, and so there is in a tree trunk. If you weigh the egg before and after boiling, you will find its weight is unaltered by the boiling. None of the water has escaped. The shell and its lining forbid the escape of any fluid. But the heat of the water in the saucepan induces the contained fluids to seek to expand. Their expansion is forbidden by the resistance of the shell, and compression of the fluids results. The consequence is the water combines with the other contents of the egg, and all becomes solid. It is just the same with the fluids in the tree when treated by my method."

"Thank you, Colonel Haskin. You have made that quite plain. I had never thought of it in that way. And so you put your stacks of timber into the cylinder in the same way as if you were going to creosote them?"

"Yes, under a pressure of 200 lbs. to the inch, which is a very much higher pressure than is employed for forcing in the creosote oil. And, you see, I do not begin by creating a vacuum and extracting—as is done before creosoting—the fluids from the timber."

"I see that. Then am I to understand that your method dispenses with the need for seasoning the timber before it is treated?"

"That is so. We take timber fresh-cut, even though it be timber of the youngest and most rapidly growing kind, such as is common in some parts of my country, and we put it into the cylinders, and treat it right away. Our process is the same as Nature's. But what Nature takes a long time—years and years—to effect, this process accomplishes by great pressure and great heat combined in a *few hours*. Of course the time required by my system, though usually about six hours, varies according to the nature and condition of the timber we are dealing with. But it is always a question of a few *hours'* difference only."

Here the Colonel drew my attention to one of the many specimens with which his room was crowded—a large plank of poplar of great width and beautiful colour, highly polished. "Only a few weeks have passed," said he, "since the tree of which this is part was growing green. It was treated by my process immediately after it was cut down."

He went on to explain that newly cut timber is always much heavier than seasoned timber, because the fluids of the latter have had time to evaporate. And it was only necessary for me to lift the various specimens in the room to satisfy myself of their having retained all their original density.

The Colonel dwelt on the well-known fact that at great altitudes, where the atmospheric pressure is less than 15 lbs. per inch, water will boil at less than 212 degrees Fahr., and will evaporate. By working with a 200 lbs. per inch pressure in the cylinders containing the timber, he is able to heat the air considerably over 212 degrees without the juices of the timber being boiled or evaporated. And in this respect also the inventor relies on the natural law of evaporation in its relation to pressure and heat.

On examining the numerous specimens of many different woods in the room, I found that all were alike indurated, and rendered so dense that the commonest pines and poplars took as high a polish as the hardest rosewood or mahogany; and I remarked, "It strikes me, Colonel Haskin, the effect of this process must naturally be to reduce very greatly the market for fancy woods of high price; seeing that the commonest woods, when Haskinised and polished, are of extremely beautiful appearance, the natural features of their grain and figure being *emphasised*. And at the same time the commonest woods are rendered by this process apparently as proof against decay as the hardest woods now in the market. But how about the *cost* of the process?" "Well," replied the Colonel, "we have nothing to put into the wood—no oil to buy, for example—and so we can afford to do the work at less cost per cubic foot than creosoting; we can, in fact, do it for 3*d*. per cubic foot, and less than that, according to circumstances."

"But now, what about shrinkage?" I asked; "and let me say, Colonel Haskin, that perhaps that is one of the most important questions you can be asked to answer as bearing on the probable success of your invention, so far as regards its employment for ships' decks and joinery and cabinet work. You are doubtless aware that teak is almost the only wood which does not shrink very perceptibly, and on that account teak, notwithstanding its high price, is greatly liked for joinery and cabinet work, where exquisite finish and freedom from shrinkage go hand in hand."

"Yes," he replied, "and you know, with woods generally, the greatest amount of seasoning does not put an end to shrinkage; for if you replane old boards, no matter how old they may be, they will, in most cases, show further shrinkage after being redressed with the plane."

"Certainly, Colonel; every experienced architect would corroborate that statement as being not less true than remarkable."

"Well, think of it," said he; "consider the great heat and pressure to which, in my process, the wood is subjected. It is so very great as to render the material subsequently indifferent to changes of temperature such as, in the cases of untreated woods, induce shrinkage; which are very trivial by comparison."

"How does Haskinised wood suit tools?" I asked. "Does its additional density make it harder to work?"

"The reverse is the case," replied the Colonel, "for the tool, in working unprepared wood, has to deal with hard fibre and soft integument at the same time; so that the resistance on the cutting edge is more or less unequal, according to the nature of the wood, the tool being jerked or jumped more or less in consequence. But in working wood which has been vulcanised—or, as some people have now got to call it (after me), 'Haskinised'—the plane or chisel, or the tool whatever it may be, encounters uniform resistance, and works in consequence all the more smoothly and pleasantly."

"Do you not find, Colonel Haskin, that the wood, through being so heated and dried, becomes brittle and short—that is to say, loses its elastic strength?"

In reply to this question, the Colonel unlocked a large flat cabinet, and showed me its contents. He said: "All these slips of wood are, as you see, of one inch square section. They were all cut from the same pitch-pine plank. Half of the number have been treated by my method, and the other half not. The plank was 6 feet long by 1 inch thick, and of such width that six strips, each an inch wide, were cut from it. Then these six strips were cross-cut into twelve lengths of 2½ feet each, six lengths of 5 inches each, six lengths of 4 inches each, and six lengths of 3 inches each. The short lengths were compressed till they crushed, and the long lengths were loaded as beams till they broke transversely. The experiments were made by the testing machines of the Stevens Institute, Hoboken; and here you see on each piece is ticketed the exact number of pounds stress which broke it. There were eighteen distinct experiments of crushing, and in every one of those the vulcanised wood proved stronger than that not vulcanised, the average superiority being over 23 per cent. Then in transverse strength thirty-six experiments were made, in every one of which the vulcanised wood proved stiffer and stronger than that not vulcanised—the average difference being, in the modulus of rupture, more than 21 per cent., and in the modulus of elasticity, 20 per cent., in favour of vulcanisation."

"Of course you will understand," continued the Colonel, "that in some cases the effects of vulcanisation on the strength of wood will be not so great, and in other cases even greater, than these experiments show, as the amount of difference must depend largely on the nature and condition of the wood treated. But you may take it as proved that in all cases, without any exception, vulcanising timber strengthens it."

The Colonel gave a humorously luminous account of the havoc wrought on timber and woodwork generally by insects. He spoke of the need for insect powders, and all sorts of specifics for dissuading the vermin from harbouring in the woodwork of dwelling-houses and other buildings. "Why do they come?" he asked. "Because in the soft parts of the wood they find their food, They come because they are hungry."

I could not help laughing at this quaint theory of the vermin pest. Yet it struck me as being very rational, and I said so. Then the Colonel lifted a large lump of very dry-looking wood from one corner of the room, and placed it on the table before me. "A friend of mine," he said, "who traded to India, after telling me of the terrible voracity of that timber devourer the white ant, asked me to let him test my system by giving him a piece of treated timber to place in a white ant's nest. So I gave him that very piece of pine. There it is, you can see for yourself. It has been left lying in white ants' nests for very long periods, first in one nest, then in another, and still another. But they have all, as you see, left it quite untouched."

In another corner of the room stood a heavy railway sleeper which had been thirteen years laid in America, and it looked to me as if it might have continued in use another 130 years without deterioration. And I learnt that Haskinised sleepers are now largely used in America.

The Colonel remarked that Egyptian mummy coffins appeared to him to have been in some degree Haskinised, by burning or charring both within and without. "Also," he said, "when we char the ends of posts which we embed in the ground, that undoubtedly acts upon the skin of the wood charred in the same way as my process does."

He showed me photographs of the works recently established at Millwall-on-Thames, where there are several very strong cylinders, each more than 100 feet long, having a railway running through each. The timber to be Haskinised is stacked on little iron trucks and run into the cylinder; then the cylinder door at one end (a wonderful piece of mechanism this door is) is fastened, and the air-pumps, driven by powerful steam-engines, force the air through the cylinder after first forcing it through a furnace where it gets heated to a high temperature. The air-pipes are so arranged that when one cylinder is being charged with, or emptied of timber, the other cylinders are full charged and working. And in order to avoid loss of heat and loss of time, many wise mechanical precautions have been employed by Messrs. Gallaway, of Manchester, the well-known makers of boilers and engines, who have fitted up the Millwall establishment, and are likely to fit up other similar establishments throughout the United Kingdom and abroad.

The Colonel told me the Directors of the North-Eastern Railway Company had visited him on the previous evening. He has secured from them, I understand, a very big order, viz. for all the timber work—some hundreds of thousands of cubic feet—required for the new coal staiths at Dunston-on-Tyne, near Newcastle; and arrangements are now being made for setting up on the Tyne an establishment for Haskinisation, like that at Millwall.

At the close of a two hours' exceedingly instructive conversation, only a few of the more salient points in which I have been able to summarise in this sketch, I came away, feeling really glad that I had, for once in a way, come out of my office to see something and learn something well worth going much further to see and learn.

The Colonel was greatly pleased and interested when I told him I possessed at home a piece of "Haskinised wood" (*naturally* Haskinised) which the most learned geologists considered may be about twenty thousand years old—a piece of bog oak, dense as iron, black as coal, and immensely strong—and to all appearance absolutely everlasting in its strength and incorruptibility. "Ha!" said this wood-curing enthusiast, his eyes glistening as he spoke, "I *should* like to see *that!*"

In pondering, since this interview, on the fields likely to open for the employment of Haskinised wood, the prospect seems to me to grow wider and vaster the more I scan it. How delightful to think of the artistic possibilities this invention opens up to external as well as internal architecture! The sense of impending decay, hitherto marring one's pleasure at the sight of beautiful and quaint modern half-timbered villas, will become a thing of the past when we use Haskinised timber. Why should floor-joists, floor-boarding, wall-plates, lintels, beams, and roofs be constructed of corruptible decaying timber, when timber decay-proof can be found? Baltic white wood, such as jerry builders use for its cheapness, if Haskinised at 3*d.* per cube foot, will prove cheaper than the best Baltic red wood, and also more durable. Paint will no longer be needed to protect external woodwork, if it be Haskinised, and the lovers of Ruskin and of unvarnished honest reality in architectural effects may well rejoice that the lying paint no longer need be requisitioned to hide ever increasing corruption and decay in the woodwork about the jerry-built homes of the million. Nor will the homes of the people continue to harbour in their timber repulsive insects.

But while in architecture, both at home and abroad, and especially in our forest-clad colonies, the scope for Haskinisation is vast beyond all estimation, it is also likely to be largely employed in engineering works; not only for railway sleepers and piles, and timber work generally, to quays, docks, coal staiths, and the like structures, wherein it has been customary to employ creosoted timber, but also in many cases *as a substitute for steel* or iron.

Railway bridges are needed in extensive districts of Canada and Africa, as well as in non-British lands, where timber is abundant, but where steel cannot be conveyed, except at such great cost as to make it worth its weight of some much more precious metal when its gets there. Say Haskinising works were established at Dawson City, Alaska, and at Bulawayo for example; then the cost of railway bridges and other engineering structures would be greatly reduced by employing the Haskinised native trees, instead of steel from England or the United States. That is a consideration which Mr. Cecil Rhodes might just now reflect on to some advantage, confronted as he finds himself by the necessity of cutting the coat of his dream of African British Empire according to the cloth of vulgar *£ s. d.* considerations.

Those famous timber constructions, the high-level bridges on the North-Eastern Railway in the neighbourhood of Newcastle and Durham, erected two generations ago by "Ben." Green—that clever North-country architect, long dead, and wellnigh forgotten—have, till recently, sustained the constantly increasing weight of railway traffic in this busy centre of national industry; and had they been Haskinised, they would not have needed to be removed or superseded.

What a satisfaction it would be to know that the timber of St. Paul's external dome had been originally Haskinised, so as to be proof against the decay now awaiting it! And the same remark applies to all the perishable timber of our noblest public and private structures.

For ships' decks, Haskinised planking is likely to come into great demand.

It is being extensively used in America for the elevated railways, and especially for the exposed platforms of same; and is certain to be largely employed for telegraph poles and other electrical requirements.

For railway carriages and tramcars, as well as for private equipages, there would seem to be in Haskinisation a perfect godsend of improvement and a great saving of the periodical cost of painting and varnishing.

There seems no room for doubt that wood pavements of Haskinised timber will stand the wear of traffic better than the ordinary creosoted blocks, for creosoting timber does not indurate it as Haskinising does.

It would be futile to attempt to forecast the directions or the extent of the influence of Colonel Haskin's invention on the architecture and engineering of the future, or on the thousand-and-one other kinds of construction which cannot be regarded as either the work of architect or engineer.

That a man should have discovered how, at small cost, to render timber everlasting and decay-proof appears to me an invention of that *seed-like* nature which cannot but suggest vast possibilities of growth such as it would be idle to even attempt to dream of at present, but which will not fail to put themselves into evidence as time goes on.

9, Conduit Street, London, W., 11*th March* 1899.

CHRONICLE.

Prizes and Studentships 1899–1900.

Full particulars of the Prizes and Studentships for 1899–1900 will be found in the pamphlet issued to members with the present number of the Journal. The following is a brief summary:—

The Essay Medal and Twenty-Five Guineas, open to British subjects under the age of forty.—*Subject:* A Review of the Architecture of the Elizabethan Period (about 1550–1620).

The Measured Drawings Medal and Ten Guineas, open to British subjects under the age of thirty.—Awarded for the best set of measured drawings of any important building—classical or mediæval—in the United Kingdom or abroad.

The Soane Medallion and One Hundred Pounds, open to British subjects under the age of thirty.—*Subject:* Design for a School of Fine Art placed in a Park or Public Garden.

The Pugin Studentship: Silver Medal and Forty Pounds, open to members of the architectural profession (of all countries) between the ages of eighteen and twenty-five.—Awarded for the best selection of drawings and testimonials.

The Godwin Bursary: Silver Medal and Forty Pounds, open to members of the architectural profession without limitation of age.—Awarded for the best selection of practical working drawings, or other evidence of special practical knowledge, and testimonials.

The Owen-Jones Studentship: Certificate and One Hundred Pounds, open to members of the architectural profession under the age of thirty-five.—Competitors must submit testimonials, with drawings exhibiting their acquaintance with colour decoration and with the leading subjects treated of in Owen Jones's *Grammar of Ornament.*

The Tite Prize: Certificate and Thirty Pounds, open to members of the architectural profession under the age of thirty.—*Subject:* Design for an Isolated Clock Tower and Belfry.

The Grissell Gold Medal and Ten Guineas.—*Subject:* Design for a Spiral Staircase.

The Ashpitel Prize: Books value Ten Guineas.—Awarded to the student who distinguishes himself most highly in the Institute Final Examinations 1899.

The Arthur Cates Prizes: Books value Ten Guineas.—Presented by Mr. Arthur Cates at each Final Examination to the Student (passing the examination) who submits the best set of Testimonies of Study together with certain additional drawings.

Copies of the pamphlet may be obtained at the Institute, price threepence each.

Reinstatement.

At the Meeting of the Council held on the 20th ult. Mr. Thomas Bradford Ellison, of 21 Donaldson Road, Kilburn, N.W., was reinstated an Associate of the Royal Institute.

The New Vauxhall Bridge.

The following letter appeared in *The Times* of Monday the 6th inst.:

To the Editor of The Times.

Sir,—Will you allow us to call the attention of your readers to a matter which seems to us of urgent importance? A new bridge over the Thames, occupying an important situation and involving an outlay of half a million, cannot and ought not to be regarded as a mere utilitarian structure for traffic alone. It should be so designed as to be also a work of architectural beauty and fitness—a new ornament to the capital. To this end it seems to us that its architectural and decorative treatment ought to be entrusted to one who has made a life study of such matters.

The London County Council's design, prepared by their chief engineer, was published in *The Builder* in January. Its structural merits we do not question, but while the intention of making what is called a "handsome" bridge is evident enough, there is evidence also of the absence of the artist's hand, refining and harmonising the whole.

The publication of the design at once roused protests in your columns and elsewhere from those most competent to form an opinion upon such matters. The leading London architectural societies (the Royal Institute of British Architects and the Architectural Association) have condemned the design in unqualified terms. The Institute coupled its protest with a request that the Chairman of the London County Council would receive a deputation on the subject from some of its leading members. This proposal has been declined, and all protests ignored. To all appearance the County Council is bent upon carrying out a design at once pretentious and costly, but lacking in those qualities which would make it in any way comparable to Waterloo

Bridge or London Bridge, of which we are justly proud.

We desire to make our emphatic protest against the execution of this design in its present form, and to express our opinion that in this country, as in France, the design of an important bridge, where any attempt is made beyond utilitarian construction, ought to be placed in the hands of a competent artist, who should be responsible for its architectural detail, as the engineer is for its structure.

For the want of this collaboration of the architect with the engineer, we have already seen the erection of three bridges of deplorable design—those at Blackfriars, Battersea, and Hammersmith. We are now threatened with a fourth.

The substitution of a good design, so far from increasing the cost of the bridge, would be rather likely to diminish it, since some of the features added for the purpose of adornment appear to us incongruous and unnecessary.

The London County Council has to seek Parliamentary powers for the erection of any bridge across the Thames. If it refuses to listen to advice or suggestion on matters artistic, the ratepayers of London, or those among them who care about the architectural dignity and improvement of the capital, should look to Parliament for some future safeguard against any repetition of the expenditure of public money upon structures such as that now proposed, which, in despite of the costly nature of its architectural accessories, will, we fear, reflect no credit upon contemporary architecture, upon London, or upon the London County Council.

We are, &c.

F. Cantuar.
Westminster.
Wemyss.
M. London.
Edward J. Poynter, P.R.A.
Edwin A. Abbey, R.A.
George Aitchison, R.A., President R.I.B.A.
Thomas Brock, R.A.
E. Onslow Ford, R.A.
T. G. Jackson, R.A.
W. B. Richmond, R.A.
R. Norman Shaw, R.A.
L. Alma Tadema, R.A.
Hamo Thornycroft, R.A.
G. F. Watts, R.A.
Arthur W. Blomfield, A.R.A.
G. F. Bodley, A.R.A.
Wyke Bayliss, President B.A.
F. C. Penrose, ex-President R.I.B.A.
G. H. Fellowes-Prynne, President Architectural Association.
W. Butterfield.
Mervyn Macartney, Master Art Workers' Guild.
John R. Clayton.

The following letter from the President appeared in *The Times* of Friday, the 3rd inst.:—

To the Editor of The Times.

Sir,—The County Council have got Parliamentary powers for erecting a new bridge at Vauxhall. It seems to me that, as London is fast becoming an architectural city, and is shortly to be adorned with the new Government offices, such an important structure as a bridge over the Thames should not alone serve the office of joining the two banks of the river together, but should also be an ornament to London.

We are justly proud of our engineers, who have carried iron construction to a pitch of perfection never seen before. The works of engineers, however, have been purely for use, and they have even stated that utility is their only aim—that it is a matter of indifference to them whether their structures are beautiful or hideous, so long as they fulful their purpose; and they look on sightliness as a botanist looks on the colour of a flower—as a thing of no consequence. Is it surprising, then, that when they attempt sightliness they fail?

In January last an engraving of the proposed bridge was published in the *Builder*, filling every admirer of beauty with dismay, for, if carried out, it would be an eyesore to London.

We are informed that our neighbours in France are about to build a bridge over the Seine. The rulers of that artistic and beauty-loving people have done all they can to ensure a worthy monument by associating two well-known architects with the engineers, while several eminent sculptors are nominated to execute the sculpture.

Surely the same methods should be adopted here.

It should be borne in mind that the fine monuments of a country form one of the most enduring records of its greatness, while the visitors who come to see them are a perennial source of revenue to the country.

Your obedient servant,
G. Aitchison.

150 Harley Street, W.

Professor Aitchison's letter was referred to by Mr. Zeph. King [*F.*] at the Meeting of the Institute last Monday. He said that the thanks of the Institute were due to the President for watching the progress of building in London, and for using his influence in regard to beautifying their city. His suggestion was a very happy one, that the example should be followed of their more artistic neighbours across the Channel, who employed engineers for constructing, architects for beautifying, and sculptors for adorning their bridges. He hoped the London County Council and the municipal authorities in other English cities would see their way to adopt it. The speaker concluded by moving a hearty vote of thanks to the President for his excellent letter, and for the trouble he had taken in the matter. Mr. King's remarks were warmly applauded, and his motion, having been seconded by the Honorary Secretary, was carried by acclamation.

The President, in briefly acknowledging the compliment, said he thought the thanks of the Institute were rather due to Mr. Statham for his public action in the matter than to himself. But as far as his own intentions went, he was second to none in the desire to see London made beautiful and the profession of architecture much more honoured than it was at present.

That they manage these things better in France is strikingly obvious from the following letter received from M. Chas. Lucas [*Hon. Corr. M.*]:—

2 mars 1899.

A Monsieur W. Locke, Secrétaire de l'Institut Royal des Architectes Britanniques.

Monsieur le Secrétaire et cher Collègue,—Je ne pouvais répondre aussi sommairement que me le marquait votre lettre du 24 février à votre demande des conditions dans lesquelles s'exécutent les travaux du pont Alexandre III, jeté sur la Seine entre les nouveaux Palais des Champs-Elysées et l'Esplanade des Invalides.

Je voulais vous envoyer des renseignements précis pouvant vous servir d'arguments sans réplique pour l'intéressante campagne que vous allez entreprendre dans un but supérieur d'Art public.

Comme tous les travaux de l'Exposition Universelle de 1900, les travaux du pont Alexandre III sont placés sous la haute direction du commissaire général de l'Exposition, M. Alfred Picard, inspecteur général des Ponts et Chaussées, et sous la direction plus immédiate du directeur des services d'Architecture de l'Exposition, M. J. Bouvard, architecte, directeur des Services d'Architecture de la Ville de Paris.

Les ingénieurs chargés des études et des travaux techniques de construction du pont Alexandre III sont MM. J. Résal, ingénieur en chef des Ponts et Chaussées, et Alby, ingénieur du même service.

Les architectes chargés des études de la partie architecturale et de la partie décorative du pont sont MM. Cassien-Bernard, architecte des bâtiments civils, et G. Cousin, architecte diplômé par le Gouvernement.

Tous deux, en dehors de leur brillante carrière d'élèves à l'Ecole des Beaux-Arts, de leurs succès dans des concours publics et des édifices qu'ils ont construits, sont de véritables élèves de Charles Garnier, et le premier, après avoir été longtemps l'inspecteur de ce maître à l'Opéra, vient d'être appelé à lui succéder comme architecte de cet édifice.

Vous voyez donc que les architectes du pont Alexandre III sont architectes de talent et connus comme tels.

Maintenant étant donné que les distingués ingénieurs, MM. Résal et Alby, chargés d'étudier et de diriger la construction du pont Alexandre III, en ont donné aux architectes, MM. Cassien-Bernard et G. Cousin, ce que l'on pourrait appeler *le schéma*, c'est-à-dire le dessin du gros œuvre du pont tel que ce gros œuvre s'exécute avec son arche unique d'une si gracieuse envergure et avec ses points d'attache et de butée sur les quais, les architectes ont étudié et étudient chaque jour, et font de plus faire sous leur direction tous les modèles nécessaires, qu'il s'agisse des grands pylônes des extrémités du pont ou du raccordement du pont et de ses pylônes avec les murs des quais, et surtout des nombreux motifs décoratifs qui ornent la jonction des pièces métalliques entre elles ou la jonction de ces pièces avec la maçonnerie; toutes notes d'art qui feront du pont Alexandre III une œuvre jusqu'à présent sans précédent au double vue de la science et de l'art ainsi que de l'intime union de la science et de l'art.

Comme vous le voyez, l'entente des ingénieurs et des architectes chargés de l'édification et de la décoration du pont Alexandre III répond à merveille à vos desiderata.

Je n'ai qu'un regret, c'est que vous ne passiez pas actuellement à Paris, vous ou l'un de nos distingués confrères de l'Institut Royal des Architectes Britanniques; je vous conduirais rue Jean-Goujon, à l'agence de MM. Cassien-Bernard et G. Cousin, et vous les surprendriez, comme je les ai surpris hier à votre intention : l'un terminant une aquarelle à grande échelle indiquant la perspective du départ du pont du côté des Palais des Champs-Elysées; l'autre étudiant une nacelle aérienne destinée au transport électrique des visiteurs d'une rive de la Seine à l'autre ; et la masse autant que la variété, le fini et le charme de leurs études vous montreraient toute l'importance de leur collaboration dans l'œuvre du pont Alexandre III.

Mais peut-être feriez-vous bien, pour être édifié plus complètement à ce sujet, de faire écrire par notre éminent président de l'Institut Royal des Architectes Britanniques, M. G. Aitchison, à S. Exc. M. l'Ambassadeur d'Angleterre à Paris, afin que Son Excellence veuille bien demander au Gouvernement français que MM. Cassien-Bernard et G. Cousin soient autorisés par MM. Alfred Picard et J. Bouvard à distraire, en faveur des collections de l'Institut Royal, quelques autographies d'ensembles et de détails des nombreuses séries d'études que, depuis longtemps déjà, ils font au jour le jour pour la décoration du pont Alexandre III.

Veuillez, monsieur le secrétaire et cher collègue, agréer l'expression de mes sentiments dévoués.

Charles Lucas,
Hon. Corr. M. R.I.B.A.

The Admission of Lady Associates.

At the Business Meeting of Monday, the 6th inst., Mr. Henry Dawson [*F.*], in accordance with the notice issued to members with the last JOURNAL, moved as follows :—

> "That, with the object of securing legal action in the election of candidates for membership of this Institute, the members thereof request the Council to obtain, at the earliest convenient date, the written opinion of some eminent Queen's Counsel of independent position as to whether women are eligible as Associates or Fellows under the terms and provisions of the existing Charter and By-laws of the Royal Institute of British Architects. And that the Council do report such opinion to the members at the earliest convenient date."

Mr. H. DAWSON said he wished, first of all, to make a few observations as regards his action in the matter. It would be accepted by all who knew him, and his age and position in the profession, that this was a matter of no personal or selfish interest on his part. He had taken it up really in the interest of the public and of the profession generally, and especially in that of the junior members of the profession. He had two objections to the action taken by the Institute in admitting a lady as an Associate. His first objection had been, and was still, in the interests of the public and of the profession. It would probably appear to some, at first sight, as somewhat singular that he should take up this position, because he yielded to no one in his strong advocacy of that important movement, the higher education of women. But when it came to applying the knowledge and the culture of women to our ordinary callings, there must necessarily be some limitations. In his humble judgment, one of those limitations was that of the profession of architecture. It was perfectly true that a lady of education and of proper professional training might be a very efficient assistant in the work to be done in an architect's office; but while stating his own view, he submitted it to the judgment and good sense of members, whether the more important part of an architect's duties, namely, his outside work in the conduct and supervision of buildings, could be performed by a woman in the efficient manner such duties ought to be performed. It must be remembered that the Institute Charter was granted for the study and practice of architecture, and he submitted that the election of women either as Associates or Fellows would tend to the prejudice and deterioration of the good reputation of the profession as being composed of competent men for practical knowledge and work. His second objection was in the interest of the junior members of the profession. It was no secret how difficult it was for hundreds of young architects to make a decent living in their profession : was it wise, therefore, was it expedient, was it even kind or considerate to these junior members to introduce another element of competition amongst them when competition was already so keen ? Of course any lady of good training might, if she thought fit, take up the calling of an architect in London or the provinces or elsewhere ; but was it wise or desirable for the Royal Institute of British Architects to promote and encourage ladies to do so, and thus bring about what was inimical to the material interests at all events of the junior members of the profession ? But he would not dwell further on those objections. It would be said, and he fully concurred, that they were matters of opinion ; but whether members differed, or whether they agreed with him, he ventured to believe that all would be desirous that in such a remarkable departure as that taken from the traditional practice of the Institute for over sixty years, in the election of a woman to membership, it was most important that the Institute as a corporate body, and that their executive, the Council, should be reasonably assured that their action in the matter was strictly legal, otherwise the Institute, and especially the Council, would be putting themselves in a false position. He should like to be allowed to explain to the Meeting what had prompted him to persevere in his motion. After the meeting of the 5th December 1898, when the election of a lady to the Associateship took place, on thinking the matter well over, he resolved that, in order to remove suspicion of his acting, even at the age of threescore years and ten, from a spirit of self-will or of too much confidence in his own opinion, he would incur the cost of obtaining counsel's opinion upon the matter ; and with the determination that if such counsel's opinion should be in disagreement with his own views, he would retire from the contest and inform the Secretary of the Institute to that effect ; but if, on the contrary, counsel's opinion should accord with and be in support of his own, then he should feel it his duty to proceed. Accordingly, with the aid of his solicitor, he obtained the opinion of counsel—not a Queen's Counsel, but a man well known as a very able barrister, Mr. Brooke Little—and he must say candidly that the perusal of that opinion convinced him that it was a most careful, decidedly cautious, and very impartial presentment of the case, and therefore its conclusions were proportionately valuable. Now, as he regarded those conclusions as being clearly in support of his views as to the ineligibility of women to membership of the Institute under the present Charter and By-laws, he considered it his duty to proceed with the motion. The case that was submitted to counsel was of a very simple form indeed ; it was practically in these words : Whether under the terms and provisions of the present Charter and By-laws women are eligible to be elected as members of the Institute either as Associates or Fellows. Mr. Brooke Little's opinion occupied nine pages; he went most impartially and carefully into the objections or arguments upon the opposite side and then replied to them. But, like some of the judges in the superior courts, who are accustomed sometimes to state the conclusions at which they have arrived before proceeding to expound the facts, Mr. Brooke Little's opinion really was contained in the first clause, which he would read. It began in a cautious way: "It is not easy to form an exact opinion in this case. There are reasonable arguments both in favour of and against the action of the Council, and I think that different minds might not unreasonably arrive at different conclusions as to the legality of that action. On the whole, however, I have arrived at the conclusion that the action of the Council in admitting a woman to be an Associate member of the Institute is, in the present state of the Charter and By-laws, *ultra vires* the Council." Afterwards, for the elucidation of the grounds of his opinion, he states three known canons of interpretation of statutes, and then, after referring to the generic descriptions, "loving subjects" and "persons" in the Charter, he calls attention to the incorporation clause (page 22 of the Institute copy) in these words: "It is to be "noticed however that in the incorporation "clause (p. 22) the Corporation is to consist of "present members of the Society and of those "who shall at any time hereafter become members "thereof according to such regulations or By-"Laws as shall be framed hereafter." (That was counsel's quotation). Mr. Little then argued—"So "that if the membership is restricted to men by "the By-laws, the immediate and present effect "will be the same as though the restriction were "imposed by the Charter itself." Then in another clause he gave a very crucial statement of the case: "In the By-laws themselves the "masculine gender is used exclusively throughout, "and the first By-law is a good type of all. "If the By-laws stood alone it would be "almost impossible to contend that they "are intended to apply to women as "members of the Institute." Then, after further arguments upon the interpretation canons, he proceeds thus:—"When it is borne in mind that "the original 'loving subjects'" (those words are a quotation) "forming the Society were all men at "the date of the incorporation of the Society, and "the admission of women into the professional "ranks of architects was not dreamed of, and that "during the 60 years of the life of the Society "none but men had been admitted to its member-"ship, and that in 1887 and 1889, when the new "Charter and By-laws were framed, no allusion "was therein made to the admission of women to "membership, any other interpretation of those "words will, I think, produce a consequence "which was never contemplated." Those words, "will produce a consequence which was never "contemplated," Mr. Dawson explained, were in reference to the canons of interpretation, under the Act of 1889, of Statutes and Charters. In the next clause the opinion went on to say: "It "would have been very simple, either to have "adopted the words 'he or she' 'his or her' in "the Charter and the By-laws" (those of 1887 and 1889) "where the words 'he' and 'his' "alone occur, or to have provided therein that "the masculine should include the feminine." Mr. Little also dealt with two very important instances of public bodies, namely, the "London University" and the "College of Physicians," who were desirous to admit women to membership, respecting whose action he wrote as follows: "The proceedings which have taken place with "regard to two other chartered bodies are in-"structive, and fortify me in the opinion I have "formed. In the charter granted to the London "University 6th January 1863, no word is used "showing any distinction in sex until section "37. In section 41, it is provided that the "Chancellor, Fellows, &c., shall have power to "examine *Candidates* and grant certificates, and "at the conclusion of every examination of the "candidates, the examiners shall declare the name "of every candidate whom they shall have deemed "to be qualified to receive such certificate, and "*he* shall receive a certificate in which the branch "or branches of knowledge in respect of which *he* "has been allowed to obtain the certificate shall "be stated. The masculine *him* is also used in "sections 37 and 39 with regard to the conferring "of degrees. When it was desired to admit "women to examinations and degrees at the Uni-"versity, the Council evidently did not consider "that the general provision in the Charter to "admit 'persons' and 'candidates' empowered "them to extend the privilege to women, and "consequently a new supplemental Charter was "applied for and granted in 1878, which by "section 5 provided, 'We grant that all powers "and provisions relating to degrees and certifi-"cates of proficiency contained in the Charter of "6th January 1863 shall henceforward be read "and construed as applying to women as "well as to men.' These Charters are to be "found at the commencement of the annual "calendar of the London University, and it "is very difficult to see on what ground women "should not have been admitted to examination "and membership of the University under the "Charter of 1863 without the necessity of a new "Charter, if the contention now raised that women "are admissible to examinations and membership "of the R.I.B.A. under their existing Charter and "By-laws is well founded. It is, I think, obvious "that those who advised the London University "that a new Charter was requisite to legalise the "admission of women to their privileges, would "be of the same opinion with regard to the "powers of the R.I.B.A. under their existing "Charter." "The other case," Mr. Little continued, "is the Charter of the Royal College of "Physicians, 10 Hen. 8, which used masculine "terminology throughout. This Charter was "confirmed by statute 14 & 15 Hen. 8, c. 5, and "it was deemed necessary to pass an Act of Parliament—viz. the Medical Act 1876—to extend "the power of the College to the granting of "medical certificates to women." The counsel then went on to put forth the arguments which might be urged on the opposite side, and replied to each one in an instructive manner. Finally, in his last clause he repeats his opinion in the following words: "On the whole, therefore, it "appears to me that the balance of reason and "argument is on the side of those who contend "that women are not now legally admissible "under the terms of the Charter and By-laws." Having quoted the salient clauses from an able counsel's opinion, it appeared to him (Mr. Dawson) to be most desirable that the Institute, and the Council especially, should not occupy anything like a false position upon this question, but that they should be reasonably assured that the action they were taking was strictly legal. Therefore he would ask whether, on the broad grounds of wise expediency, and for the purposes both of feeling sure of their own ground and of meeting the reasonable objections and doubts of those members who differed from them, the Council would accept his motion and consent to obtain the opinion of some Queen's Counsel of the highest standing, whose opinion would command general acceptance, so as to place the question beyond reasonable doubt; and that, if they should be so advised hereafter that some Parliamentary action was necessary, they should take such further steps as might be necessary to put themselves and the Institute in a position of legal security.

Mr. Dawson then moved his resolution in the terms set out at the beginning of this report.

Mr. J. Douglass Mathews [*F.*] said he was in hopes that it would have been unnecessary for this Resolution to be proposed or seconded; that it would have so commended itself to the Council that they would have adopted it and been glad of the opportunity to ensure that what had been done was perfectly legal. It was all-important to everybody concerned that legal opinion should be obtained upon which they could act. He had every respect for the members of the Council, both as architects and as men of business, but members must go higher than the Council for their law, and this was purely a legal matter. It was only right that members should be assured that the Council's action was legal, and he was sure the Council themselves would be glad to find that what had been done was legal. The proposition was a very mild, and just, and reasonable one, and he hoped it would be carried.

The Honorary Secretary pointed out that counsel's opinion could generally be got either way, according as the case was laid before him. The weak point in the opinion of Mr. Dawson's counsel as quoted was that he relied solely on the By-laws, and not on the Charter. The By-laws, however, were subject to change. It was only in the By-laws that the word "he" was employed. The Charter carefully omitted any reference to sex; it simply said "every person" or "any person." If the question were submitted to counsel, and his attention drawn to the difference between the Charter and the By-laws, they could no doubt get an opinion directly opposite to that of Mr. Dawson's counsel. The question was, did the general body of the Institute desire to exclude ladies? There could be no reasonable objection to counsel's opinion being sought if there was the slightest suspicion that the Council's action was illegal. It was a great pity, he thought, that the objection had not been taken earlier. The fact that this lady was a candidate for election had been mentioned in the Journal, and it was a member's own fault if he was not aware of it. A few years ago Mr. Ernest George, on the lady's behalf, asked the Council whether there would be any objection to her becoming a member of the Institute if she passed the examinations; and the Council, taking the word "person" in the Charter to mean either man or woman, answered that she could become a member. She had been put to the expense of studying architecture, had passed the examinations exceedingly well, and was duly elected. Then there came the objection.

Mr. Dawson said that objection had been taken on the nomination. Members had no power to object earlier.

Mr. Hugh Stannus [*F.*] said he had thought that Mr. Dawson was anxious only that the action of the Council should be placed on an unassailable legal footing; but, after his speech that evening, one saw that his objection was not so much to a want of legality in the Council's action, but because he objected to a woman being allowed to practise in their profession. Mr. Dawson admitted that ladies could do good office work; but as regards other duties he (the speaker) supposed one of his objections was that they could not ascend ladders. Did Mr. Dawson himself go up ladders? [Mr. Dawson, replying, said that he would retire from the profession if he could not.] Mr. Stannus thought that a very small proportion of members of the profession over the age of 60 were in the habit of ascending ladders. Anyway the duty could very well be deputed to a capable assistant. It was much to be regretted that the Resolution had been proposed and seconded on the grounds brought forward by Mr. Dawson. His reasons indeed savoured more of a Sheffield trade union. Again, Mr. Dawson made a great point of the masculine terminology being used. But when a woman went to church, was she not included in the parson's "dearly beloved brethren"? One could not help feeling regret that at a time when in so many professions freedom was "broadening slowly down from precedent to precedent" members should desire to make the Institute a close corporation. He begged to move as an amendment that the Royal Institute of British Architects do approve of the action of the Council in interpreting the word "person" as "person."

The amendment, seconded by Mr. H. Hoyne Fox [*F.*], was thereupon put from the chair, and voted upon by show of hands, when there appeared to be twenty-four in its favour and twenty-four against. A division being called for, the Ayes and Noes divided, and Mr. Dawson and Mr. Stannus acted as tellers. On reassembling, the numbers were announced to be as follows:—

For the amendment	27
Against	27

Mr. John Slater [*F.*] thought that under the circumstances it would be wiser for the Council to adopt Mr. Dawson's motion. It was a pity that anything should be done that had the slightest tinge of illegality. He would therefore suggest that, as the division was so close, the Council should adopt Mr. Dawson's advice and seek counsel's opinion.

Mr. W. M. Fawcett, *Vice-President*, pointed out that the lady had been duly elected, and if they got counsel's opinion, that would not help them out of the difficulty. The only way to decide the matter was by court of law. If any one had an objection to what had been done, let him commence an action at once.

Mr. Dawson said he knew there might be some hostile members disposed to move the Court for an injunction. But that was the very thing he wanted to avoid, and therefore he asked that the Council should get the opinion of an eminent barrister upon the question.

The President said that as he had the casting vote, he should give it in favour of the Council; but, at the same time, he thought it would be a judicious thing to get a supplementary Charter which should place the whole matter beyond a doubt.

Mr. John Hebb [*F.*] hoped the Council would have the courage of their opinion and stand firm. Counsel's opinion would not decide the legality of the action at all.

Mr. Stannus's amendment, which was declared carried by the President's casting vote, was then put from the chair as a substantive motion, with the following result:—

For the amendment as a substantive motion	26
Against	25

The Brickwork Experiments.

Mr. Owen Fleming, at the same Meeting, duly brought forward the motion standing against his name in the notice-paper—viz.

> "That the attitude of the Council towards the Brickwork Experiments recently conducted by the Science Standing Committee is calculated to impair public confidence in the Royal Institute, and that the Council therefore be invited to take such steps as may be necessary to bring the matter to a satisfactory conclusion."

These brickwork experiments, Mr. Fleming said, began as far back as 1893, and he intended very briefly summarising their history in order that the Meeting might realise the somewhat extraordinary state of affairs that had arisen. In 1893–94 the Science Committee, to whom the matter was entrusted, reported as follows: "That in order that accurate information may be obtained as to the strength of brickwork, a series of experimental tests be undertaken, and that funds be obtained for that purpose." A subscription list was started, and it was this list that really was the basis of the action he was now taking. If this had been simply a matter within the walls of the Institute, and the honour of the Institute as a whole had not been concerned, he should have regarded it purely as a matter for the consideration of the Council and the Science Committee, and he should not have moved. But the Council or the Science Committee (he was afraid he could not distinguish between them) went outside the Institute and asked for subscriptions from members of the public to carry out experiments as to the strength of brickwork with a certain definite object and aim; and they received those subscriptions, which were entered in the books of the Institute. The acceptance of these subscriptions carried with it a responsibility which, he regretted to say, had been too lightly regarded. What had been the response of the Institute to the generosity of the public? He would go on with the history and let the facts tell their own unhappy tale. In the next year (1894–95) the Science Committee reported that they had taken certain action, and proposed to carry on experiments by which it was intended to establish what ratio existed between the strength of individual bricks and that of brickwork composed of similar bricks in different kinds of mortar. That was the aim set forth in the official Report of the Science Committee for 1894–95. There were to be three series of tests. The first series were reported to the Institute on the 30th March 1896, when there was a long discussion, and the Chairman of that Meeting stated that "in the course of time we should no doubt have a very valuable text-book on the subject." It would thus be seen that at this time the Committee, the Chairman, and the Institute all intended that the matter should be carried to a definite conclusion and embodied in a book. The intention was perfectly clear. In 1895–96 the Science Committee in their Annual Report again referred to the completion of the first series, and stated that "when further experiments are completed the Committee expect to be able to lay before the Institute detailed and reliable information from which general conclusions may be arrived at with regard to the strength of brickwork of various descriptions at different stages." Still a definite object and aim set forth—viz. experiments leading up to a conclusion. On the 14th December 1896 the second series of experiments were reported, and the Committee then stated that when the third series of experiments were completed the Committee would be in a position to make another final report upon the whole series, and expected to be able to establish from the data derived from the experiments definite rules as to the safe loads for the various kinds of brickwork with which they had been dealing. Turning to the report of the Science Committee for 1896–97, they were informed that the Science Committee hoped in due time to issue in pamphlet form the results of the whole series of experiments—still the same line of thought as before. On the 13th December 1897 a slight change was observable in the ideas governing the persons who were conducting these series; and the Institute was informed in the Science Committee's final report that "The Committee do not propose at present to give any fixed rules based upon the results or information gained by these experiments, as it is hoped that the Council will sanction"—this was the first time in connection with this matter that the Council and the Science Committee were referred to as two different bodies—"the preparation of a careful analysis of the facts contained in the three Papers, and issue the same in a suitable shape. If this is done it may be possible to generalise and formulate rules which should govern the use of different kinds of brickwork as the supporting features of the structures erected under our superintendence." The Committee then proceeded to give a few of the impressions they had derived from the three tables; but they stated that these were only general assumptions, which required further consideration. Up to this time everything had been harmonious, but now discords became apparent. It was necessary to trace the early history of these discords, and to lay bare the influence which had ultimately brought about the present state of affairs. It was very peculiar that, upon the discussion of this third series, a member of the Science Committee thought it necessary to state that the arrangement of the experiments was carried out by a sub-committee under the direction of the Science Committee. Surely the Science Committee were responsible, and it was rather an unusual thing for a member to make that statement. But this member went on to say that there was really no report which could be called a Report of the Committee—that the Report before them had been made by two members of the Committee. "Personally" (this member said) "he would rather have discussed the analysis of the results in the Committee beforehand." That seemed an extraordinary state of affairs. A committee had been meeting and testing the brickwork, and they make a final report, whereupon a member of the Committee gets up and expresses his regret that he had not had an opportunity of discussing the matter in Committee beforehand. He did not know whether any member of the Council or of the Science Committee would explain that state of affairs. But from this time the Council—should he say became shy; from this moment the Council and the Science Committee seemed to drift apart, and it became evident that there was a gradual straining of the relations between the Council and the Committee. That was not a matter the Meeting could go into, except that the result was that the Institute as a whole was still waiting for some definite conclusion as to the Brickwork Experiments. In the Science Committee's Report to the Council for 1897–98 the Committee wrote:—"The Committee are awaiting the decision of the Council as to publishing an account of the whole of the experiments in an octavo form." The Council, following their own line of action, cut that out altogether. At the General Meeting that was protested against; the Meeting held that the Council ought not to have cut a portion of the Science Committee's Report out without giving some reason; and ultimately the chairman of that Meeting replied that the clause was omitted from the Report because it was, "in the opinion of the Council, premature. It involved a very large and important question of expenditure, which had to be considered by the Finance Committee, and as there was need for further revision, and the proposal would entail very heavy expenditure indeed, it was thought that the question, being still undecided, would be referred back to the Committee to make further inquiries; and it was therefore premature to bring the matter in its present state before the Institute." The Meeting would not accept the mutilated report, and inserted the following footnote, which appeared in the JOURNAL when the Report was published:—"The question of publishing an account of the whole of the experiments and results in octavo form is being referred to the Council for their decision." This brought the matter up to the summer of 1898. One would have thought that the feeling expressed at that General Meeting would have enabled the Council to realise that their policy was not acceptable—that the Institute, in fact, had an undischarged responsibility to the members of the public who had subscribed to have these experiments made. But the hint was of no avail. The Council persisted in their attitude, and their next step was really astounding. They decided that the experiments might be published. On what condition? On condition that the name of the Institute was not mentioned from cover to cover of the publication. That scarcely seemed to leave the matter in a position satisfactory to members of the Council themselves. He had ventured to suggest that in a letter to the Council, but only received a *non possumus* reply; so that ultimately he was forced—that was the only word he could use—to put this motion down on the paper. It was a most unpleasant position for any member of the Institute to have to criticise the action of the Council; but what was there to be done? Was the matter to remain in this position? Were they, as an Institute who had set their hands to a task, to carry out certain experiments to form some idea of what brickwork would carry—were they to confess their impotence to bring their undertaking to a conclusion? It was impossible, and therefore he ventured to hope that the Council would see their way to take the matter up in a business-like way, and to bring it to a conclusion which would be worthy of the Institute and its members.—Mr. Fleming concluded by formally moving his resolution.

Mr. C. H. Brodie [*A.*] seconded the motion. Mr. Fleming had made out an extremely good case for it, and it was quite impossible to leave the matter where it then rested. In inviting the Council to take such steps as might be necessary to bring the matter to a satisfactory conclusion, he would suggest a rider being added to the effect that the Council should instruct the Science Committee to immediately proceed with the publication of those results in book or pamphlet form, with the addition of certain conclusions which the Committee, who had so carefully watched those experiments, were quite capable of formulating. No other result should be looked for than that. As to the expense, the sale of a publication containing such valuable information would more than pay the cost of producing it. He did not think the action of the Council in the matter had been at all consonant with the dignity of the Institute or the respect due to one of their Standing Committees elected by the general body in the same way as the Council themselves were.

The President, on behalf of the Council, said they were not at all satisfied with the conditions under which the experiments were made. The Council had given Mr. Max Clarke full permission to publish the conclusions arrived at; but the Council could not give their *fiat* that the experiments were of such a nature as to lead to definite conclusions.

The Hon. Secretary, replying to an observation by Mr. Brodie that the Council distrusted the Science Committee, said that was not the case. The fact was, Professor Unwin, a member of the committee which had undertaken these experiments, said that they were unsatisfactory and unreliable—that they were carried out under peculiar circumstances which did not give a satisfactory and final conclusion as to what brickwork would stand. That was an opinion which the Council could not resist.

Mr. Brodie said that he was quite aware of Professor Unwin's opinion; but Professor Unwin, of whom he spoke with all possible respect, had made a statement that certain materials used in the experiments were of a different character from what they were. It was proved to Professor Unwin that those materials came from precisely the same heaps, yet he declined to withdraw his expressed opinion.

Mr. Fleming's motion was then put from the Chair, and carried by a majority of eight, 24 voting in its favour, and 16 against it.

The Hon. Secretary, having remarked upon the indefiniteness of the motion, and what would be considered a satisfactory conclusion, Mr. Beresford Pite suggested that Mr. Fleming should be invited to state by letter what he wished the Council to understand by the words "bring the matter to a satisfactory conclusion," and then the Council would have it before them at their next meeting.

Mr. Brodie pointed out that the rider he had suggested would meet the case. The matter should be sent to the Science Committee to deal with. They had carried out the experiments and knew all about them, and the Council did not. The Committee were the proper people to bring the matter to a satisfactory conclusion.

Secret Commissions.

The report of the Special Committee of the London Chamber of Commerce on the subject of Secret Commissions has been issued. The report emphasises the "heinousness of the system of secret commissions and its detrimental effect upon morals and business," and says the mass of corruption which the evidence before the committee shows to exist may appear to some persons so great and complex as to render it hopeless to struggle towards purity. The committee, however, do not take this view of the matter, and accept the improvement which has come about in the last fifty years as a fact full of encouragement for the commercial community of Great Britain. If legislation is to be attempted to check the abuses which still remain, "it appears to the committee," the report continues, "that such legislation should render criminal the payment and the receipt, the offerings and the solicitation, of any corrupt payment, and also the giving of any invoice or other document calculated to enable the recipient to commit a fraud upon his principal, and that it is expedient that such legislation should be initiated by the London Chamber of Commerce or supported by them." The committee further suggest that all professional and trade bodies (such as those representing the medical, legal, artistic, and other professions and trades) be recommended to make an emphatic declaration on the subject of secret commissions, and adopt the course already taken by the Royal Institute of British Architects, the Institution of Civil Engineers, and other bodies, by inserting into their by-laws a stipulation that any member guilty of the pernicious practice will be expelled the society by the council. In order to make such a provision effective this would, it is added, require the aid of the public as well as of the members of the several professions and trades.

In view of the above, the following letter, which has been received by a Fellow of the Institute and forwarded by him to the Secretary, is instructive. The public, as well as such firms as Messrs. Geo. Wright & Co., ought to be made to learn that every member of the Royal Institute of British Architects subscribes to the following declaration: "I promise and agree that I will not accept any trade or other discounts, or illicit or surreptitious allowances, in connection with any works the execution of which I may be engaged to superintend, or with any other professional business which may be intrusted to me." The letter referred to is as follows:—

1/3/1899.

Dear Sir,—As we notice in the *Building News* that you are the architect for the extension of the Club premises, we have ventured to send you by same post a copy of our illustrated catalogue of new tables and billiard-room furniture, and beg to enclose herewith list of a few second-hand tables—some of which have only been in use a short time and are quite equal to new—and shall esteem it a great favour if you would kindly hand same to the Secretary and use your influence on our behalf; and in the future we shall be most happy to allow you a discount of 5% off any orders you may be able to place with us. We would specially draw your attention, &c. . . .

Trusting to be favoured with your esteemed commands, which shall have our best attentions,

We are, Sir, Yours obediently,
Geo. Wright & Co.

The late Thomas Rowe [*F.*].

Mr. G. Sydney Jones [*A.*], Hon. Secretary of the Institute of Architects of New South Wales, sends news of the death of Mr. Thomas Rowe [*F.*], which occurred at Sydney, N.S.W., on the 14th January. The following note of the life and professional work of the deceased has been kindly furnished by Mr. Jones:—

Mr. Rowe was founder, in 1871, of the Institute of Architects of New South Wales, and for several years, and again recently, occupied its presidential chair. That institution owes much to his care and thoughtfulness. In 1884 he was elected a Fellow of the Royal Institute of British Architects. Born in Penzance, Cornwall, his father being a builder and contractor, Mr. Rowe was educated at Barnes Academy, and in 1848, after some years of work in his father's office, he left England for Sydney. For some time he underwent the usual goldfield experience, and then settled down to work as an architect in 1856. Amongst Mr. Rowe's many works in and around Sydney may be mentioned warehouses for Messrs. Hoffnung & Co., Messrs. Vickery & Co, and others; Newington College; the Royal Arcade, the Sydney Arcade, and the Imperial Arcade; St. George's Church; the Jewish Synagogue; the Centenary Hall; and many others of greater or less note. Mr. Rowe was colonel of the Volunteer Corps of Engineers, was for some time alderman of the City of Sydney, and for years was president of the Metropolitan Board of Water Supply and Sewerage, in which capacity he rendered valuable service to the community. The deceased gentleman was in his sixty-third year.

The late Haywood Richardson Brakspeare [*F.*].

Mr. G. R. Eyre has kindly communicated the following particulars of the professional career of Mr. H. R. Brakspeare [*A.*], whose death, which occurred at his residence, Wembley, near Harrow, on February 14, was announced in the last issue of the Journal:—

Mr. Brakspeare was connected with the Metropolitan Board of Works and the London County Council for a period extending over eighteen years. Previous to his coming to London he received his professional education in the office of his father, who had a large practice, principally in ecclesiastical architecture. Mr. Brakspeare was architect for the Wembley Urban Council offices and for several private residences in the neighbourhood. He also prepared the plans for the enlargement (now in progress) of Wembley Church, of which church he was formerly a churchwarden. His high character and devotion to everything he undertook will ever be remembered by those with whom he came in contact.

REVIEWS.

BEVERLEY MINSTER.

Beverley Minster: an Illustrated Account of its History and Fabric. By Charles Hiatt, Author of "Chester: the Cathedral and See," &c. 8o. Lond. 1898. Price 1*s.* 6*d.* [*Messrs. George Bell & Sons, York Street, Covent Garden.*]

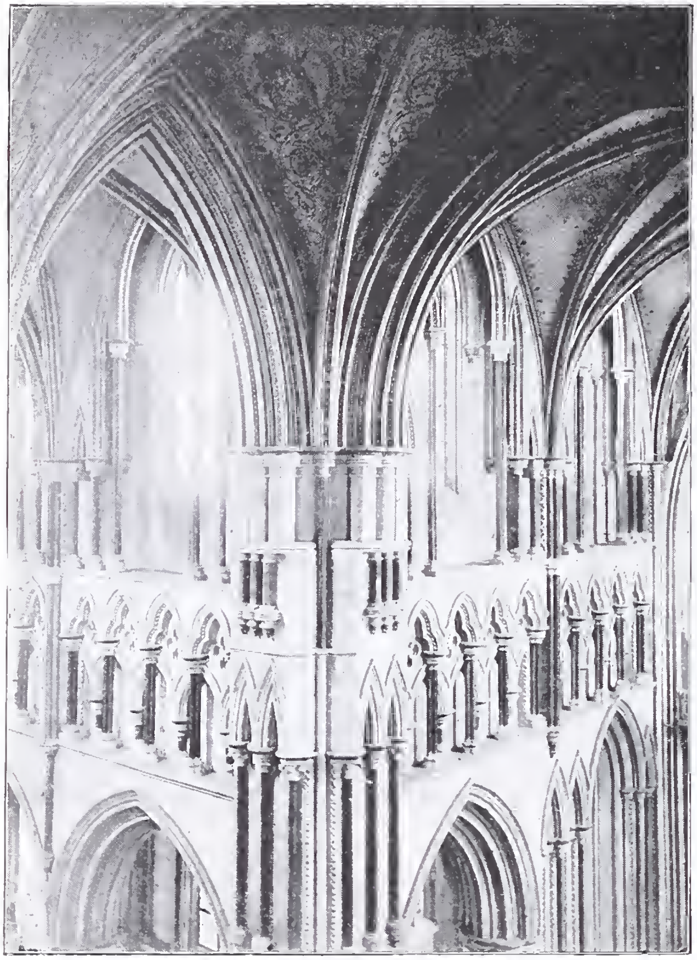
"Beverley Minster," says Sir Charles Anderson, in a careful comparative estimate of the English churches, "is for its size, taken as a whole, internally and externally, the most perfect church in England." He might have added that the interior of the choir and transepts is unsurpassed in Europe. It represents the high-water mark of Early English Gothic. In England its only contemporary rival is to be found in the presbytery of Ely; but the Ely architect was cramped by the contiguity of the Norman choir, and his design is inferior in proportions to that of Beverley. Professor Freeman was of opinion that the interior held its own, even in comparison with such giants as Lincoln and York. Its eastern limb is unmatched by anything in Lincoln except the Angel presbytery; while in everything but vastness of scale it far surpasses York. Like Lincoln and like York, it possesses the grand feature, externally, of a continuous sky-line; of a single high roof running uninterruptedly from west to east. Internally, perhaps, the roofs of Salisbury and Wells, sinking eastward by slow gradations, give more fairy-like effects. Such roofs as the latter, climbing centrally, demand, as the later architects of Salisbury saw, a central tower and spire. Beverley Minster, as the great thickness of the piers of the crossing shows, was also designed for a central tower and spire. This, however, was afterwards seen to be unnecessary, and was never built. It may well be that the designers were confirmed in their determination to omit the central tower by the fact that the central transept was slipping northward; it was screwed back *c.* 1720. But though Beverley lacks a culminating centre, yet, as in Westminster, the want of it is largely compensated for by a pair of tall western towers. Internally, the one defect is that there is no longitudinal ridge-rib to connect together the separate compartments of the high vault; how valuable in welding the bays of a long church into unity may be seen by comparing the high vaults of Westminster and Exeter with those of Beverley and the French cathedrals, most of which, e.g. Amiens, exhibit the same defect. On the other hand, the fact that the vault springs unusually high, at once clears the windows of the clerestory and greatly adds to the apparent height of the church.

From a photo. by Wilfrid Groom.

ST. MARY'S CHURCH, BEVERLEY.

Beverley and York, Gloucester and Tewkesbury, Ely and Peterborough, seem to me to belong to a series of pairs of churches in which there was an internecine rivalry; in Gloucester and Tewkesbury of a friendly character; in the others the reverse. Ely built a nave of twelve bays; Peterborough, so to say, went one better—pulled down the west front which had been commenced, and secured a length of 211 feet against the 208 feet of Ely. York put up western towers; Beverley set to work at once to copy them; the Beverley towers are much lower, but they are so slender that they really look the taller pair. York has a continuous roof; so has Beverley. York has double aisles to its central transept—a very rare feature—so has little Beverley; and what is more, it has an aisled eastern transept, whereas York has nothing to show but a north and south bay window. On the other hand, York has a central tower; honours are divided.

The Minster has greatly fallen from its high estate; the sister-churches, Southwell and Ripon, have regained their old rank as cathedrals. Beverley Minster is, we believe, in the hands of the Simeon trustees: its staff of provost, canons, chantry-priests, sextons, incense-bearers, and the rest—seventy-seven all told—has dwindled down to vicar and curates, and little is left of an income worth in our money some £20,000 per annum. Mr. Hiatt has had the advantage of the researches of Mr. Arthur Leach and Mr. John Bilson, and writes with commendable enthusiasm of the beautiful Minster and of the fine parish church. A few points seem to need revision. He tells us that the Minster was served by "secular canons." To the lay mind this conveys no meaning; monk and friar, regular and secular, to him are both alike. None of the authors of these handbooks follow the excellent precedent set by Mr. Thomas Blashill in his guide to Tintern, in explaining, briefly but clearly, the constitution and character of the monastic body by and for whom the church was built. This leads Mr. Hiatt to lose the whole point of the most interesting of the misereres. Seven of those in the Minster are satires on the Grey Friars and Black Friars who had settled in Beverley, and whose work in the slums was about as highly esteemed by the Established Church as that of the Salvation Army nowadays. On the



From a photo. by Wilfrid Groom.

THE TRIFORIUM AND CLERESTORY.

other hand, St. Mary's parish had constant trouble with the unjust pretensions of the neighbouring Cistercian Monastery of Meaux, and dresses the foxes of the misereres in Cistercian hoods. Professor Freeman is quoted to the effect that "an eastern transept is a feature purely English;" whereas it occurs first in the great church of Cluny and in St. Benoit-sur-Loire. On page 36 we are informed that "the building of the Minster practically ceases between the years 1340 and 1350;" on page 44, that the Beverley towers were probably commenced after the York towers—*i.e.* after 1443, but finished probably earlier—*i.e.* before 1475; both statements cannot be true. Mr. Hiatt prefers the west window of Beverley—a perpendicular grille—to the flowing tracery of the west window of York, which most people had imagined to be unsurpassed in England, unless by the east window of Carlisle. On page 37 he assures us that "so long as the Minster is controlled by the present authorities it is little likely to suffer from needless architectural experiments or fantastic and capricious structural alterations." The photograph on page 68 shows a miserable little box of organ-pipes with which "the present authorities" have disfigured Sir Gilbert Scott's beautiful screen. Mr. Hiatt is good enough to give another testimonial (page 135) to the clergy of St. Mary's. Our own private opinion is that there is not a parson in the country who is to be trusted with a church. Is there not a proposal to clean up the interior of Westminster Abbey? And how long is it since a clergyman proposed to turn the fire-engines on to the exterior of St. Paul's? We are sorry to find that the author finds the little town of Beverley "singularly unattractive," "its streets unlovely." Nestling at the foot of the Wolds, the view across the red-tiled roofs of the quaint old market-place, encircling a picturesque market-cross, on to the grey tower and battlements of St. Mary's, set in umbrageous elms, the street eastward spanned by a mediæval bar-house, beautiful in colour, and expanding into an avenue of grand old trees, has a most pleasant place in our memory. On page 18 "Maldon Priory" should read "Malton;" on page 40, "the pairs of the nave" can hardly be correct. A plan of St. Mary's Church might well be added.

Francis Bond.

MINUTES. IX.

At a Special General Meeting, held Monday, 6th March 1899, at 8 p.m., Professor Aitchison, R.A., *President*, in the Chair, with 20 Fellows (including 8 members of the Council) and 37 Associates, 3 Hon. Associates, and several visitors, the President moved that, subject to Her Majesty's gracious sanction, the Royal Gold Medal for the promotion of architecture be presented this year to Mr. George Frederick Bodley, A.R.A., for his executed works as an architect. The motion having been seconded by Mr. William Emerson, *Hon. Secretary*, it was

Resolved that, subject to Her Majesty's gracious sanction, the Royal Gold Medal for the promotion of architecture be presented this year to Mr. George Frederick Bodley, A.R.A., for his executed works as an architect.

The meeting then terminated.

At the Ninth General Meeting (Business and Ordinary) of the Session 1898–99, held Monday, 6th March 1899, at the close of the Special General Meeting above referred to, Professor Aitchison, R.A., *President*, in the Chair, with members and visitors present as above recorded, the Minutes of the Meeting held 20th February 1899 [p. 241] were taken as read and signed as correct.

The decease was announced of Mr. Thomas Rowe, of Sydney, N.S.W., *Fellow*, elected 1884.

The following candidates for membership in the various classes were elected by show of hands:—

As Fellow.

SAMUEL PERKINS PICK [*A.*] (Leicester).

As Associates (14).

WALTER HARGREAVES BOURNE [*Probationer* 1895, *Student* 1897, *Qualified* 1898] (Darlington).
WILLIAM ALPHONSUS SCOTT [*Probationer* 1889, *Student* 1895, *Qualified* 1898] (Drogheda, co. Louth).
ERNEST JESSE MAGER [*Probationer* 1894, *Student* 1895, *Qualified* 1898].
GEORGE REAVELL, jun. [*Qualified* 1898] (Alnwick).
JOHN HENRY ARTHUR PHILLIPS [*Probationer* 1894, *Student* 1896, *Qualified* 1898].
ARTHUR MARYON WATSON, B.A.Lond. [*Probationer* 1889, *Student* 1894, *Qualified* 1898].
JOHN CUBBON [*Probationer* 1892, *Student* 1894, *Qualified* 1898] (Manchester).
HARRY INIGO TRIGGS [*Probationer* 1892, *Student* 1898, *Qualified* 1898].
FREDERICK ROBERT HIORNS [*Probationer* 1895, *Student* 1896, *Qualified* 1898] (Margate).
JOHN KIRKLAND [*Probationer* 1889, *Student* 1892, *Qualified* 1898].
EDWARD FROST KNIGHT [*Probationer* 1896, *Student* 1897, *Qualified* 1898].
HARRY DIGHTON PEARSON [*Probationer* 1890, *Student* 1891, *Qualified* 1898].
LESLIE WILLIAM GREEN [*Probationer* 1891, *Student* 1897, *Qualified* 1898].
HENRY TANNER, jun. [*Probationer* 1895, *Student* 1896, *Qualified* 1898].

As Hon. Corr. Member.

Prof. Commendatore FELICE BARNABEI (Rome).

Mr. Henry Dawson [*F.*], having stated certain objections to ladies entering the profession of architecture and being admitted members of the Institute, proceeded to question the legality of a recent election of a lady to the Associateship as being contrary to the Charter and By-laws, supporting his contention by quotations from the opinion of a barrister to whom he had submitted the question, and finally moved that the Council do obtain the written opinion of an eminent Queen's Counsel of independent position as to whether women are eligible for election as Associates or Fellows under the existing Charter and By-laws, and that the Council communicate such opinion to members at the earliest convenient date. The motion having been seconded by Mr. J. Douglass Mathews [*F.*], an amendment was moved by Mr. Hugh Stannus [*F.*] that the Institute do approve the action of the Council in interpreting the word "person" as "person." Upon a show of hands 24 voted in favour of and 24 against the amendment. A division being called for and taken, the numbers were declared to be 27 for and 27 against. The President, having given his casting vote in favour of the amendment, put the amendment as a substantive motion, which was carried by a majority of one—26 voting for and 25 against it.

Mr. Owen Fleming [*A.*], having summarised the history of the Brickwork Experiments conducted by the Science Standing Committee, moved that the attitude of the Council towards such experiments was calculated to impair public confidence in the Royal Institute, and that the Council therefore be invited to take such steps as may be necessary to bring the matter to a satisfactory conclusion. The motion, having been seconded by Mr. C. H Brodie, was put from the chair and carried by a majority of 8—24 voting for and 16 against it.

Mr. H. Hardwicke Langston [*A.*] stated that, owing to the lateness of the hour, he would postpone the motion of which he had given notice until the next business meeting.

A paper by Mr. Arch. C. Dickie [*A.*], on SOME EARLY CHRISTIAN CHURCHES IN PALESTINE, having been read by the author, and illustrated and explained by plans and views shown by the lantern, a vote of thanks was passed to the author by acclamation.

The proceedings then closed, and the meeting separated 10.25 P.M.

Obituary.—The death is regretfully recorded of Mr. Tom Turner, of 18 Provost Road, Haverstock Hill, N.W., who was elected Associate in 1896.

ARCHITECTS' BENEVOLENT SOCIETY.

Annual Report of the Council.

Adopted at the Annual General Meeting held on the 8th March 1899.

The Council of the Architects' Benevolent Society, in presenting their forty-ninth Annual Report, have the pleasure of congratulating the members of the Society on a year of useful work, in which much has been done to relieve the necessities of deserving applicants, the sum of £654 14*s.* 10*d.* having been distributed amongst thirty-nine persons. They have also to report that there has been an increase in the amount received in subscriptions (£471 10*s.* as against £459 13*s.* received in 1897), and that the following gentlemen have added their names to the list of annual subscribers: Mr. Cecil Orr, Mr. E. Monson, Mr. H. Huntly-Gordon, Mr. Sydney Perks, Mr. H. Alexander Pelly, Mr. John Ford, Mr. W. G. Cooke, Mr. H. P. Monckton, and Messrs. Patman & Fotheringham. While there has been this increase in the subscriptions, the Council regret that there has been a considerable falling-off in the amount received in donations, the sum of only £105 12*s.* having been received as compared with £300 17*s.* 7*d.* received in 1897. Amongst the donations the following may be mentioned: Colonel Edis £21, Mr. Aston Webb £15 15*s.*, Dr. R. Rowand Anderson £10 10*s.*, Mr. A. Hessell Tiltman £10, Mr. George Inskipp, Mr. Wm. Woodward, Mr. W. West Neve, Mr. J. T. Christopher, and Mr. G. Elkington, £5 5*s.* each. The Tylers and Bricklayers Company also gave £5 5*s.*, Messrs. Patman & Fotheringham £3 3*s.*, and Mr. Sidney R. J. Smith £3. Various smaller sums were also gratefully received.

The steady increase in the number of subscribers during the past few years (the amount being now more than 50 per cent. in advance of that received in 1892) is however an indication that a growing interest is being taken in the Society, and that the work which it performs in assisting unfortunate architects, their widows and children, is becoming more widely recognised. Still, the Council feel that the number of subscribers (a little over three hundred) is small compared with the number of practising architects who are in a position to contribute to the Society's funds; and they would cordially invite inquiries from non-subscribers as to its scope and objects.

It has long been felt that the Society would be more generally supported if its existence were more widely known, and with a view to extending the knowledge of its aim and work, your Council have recently had under consideration the question of an annual dinner. It was thought, however, that this would be undesirable at the present time, and that the same object might be served if the fiftieth anniversary of the Society, which would occur in 1900, were celebrated by a dinner. A small sub-committee has therefore been formed to make the necessary arrangements for such an event, and your Council trust that the committee's efforts will be heartily supported by members of the Society and by the architectural profession at large.

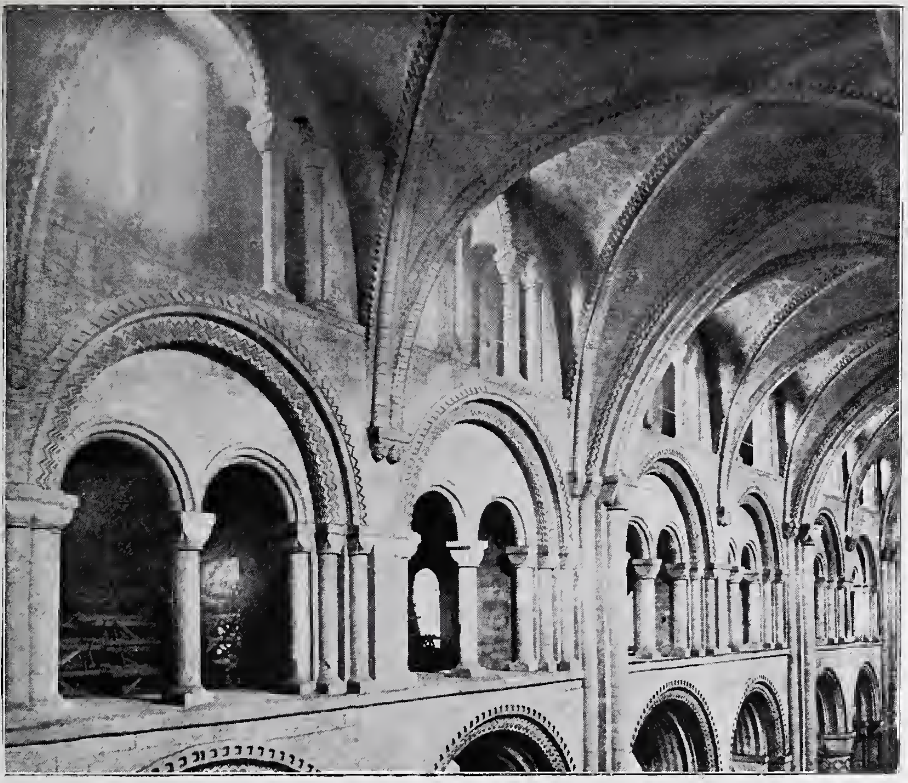
The proposal carried at the Annual General Meeting last year to increase the number of the Society's pensioners from three to six, and the amount of the pensions from not less than £15 to not less than £20, was confirmed by a subsequent general meeting specially convened for the purpose on the 13th July. The available pensions were therefore duly advertised at the beginning of the present year in the professional papers and *The Times*, and allotted to the most deserving candidates.

The Council have much regret in recording the death of three of the oldest members of the Society, Professor Hayter Lewis, Mr. J. J. Edmeston, and Mr. T. C. Hine. Professor Hayter Lewis, who has bequeathed £100 to the Society, was one of its original members, and one of its most generous benefactors. He served on the Council on many occasions and acted as Honorary Treasurer with advantage to the Society from 1886 to 1889. Mr. Edmeston had been a subscriber since 1860 and had also served on the Council. Mr. T. C. Hine was an original member of the Society and acted as a corresponding member of the Council from 1855 to 1870.

Seven meetings of the Council have been held during the year, the average attendance at each meeting being eight.

The following gentlemen, being the five senior members, retire by rotation from the Council, namely: Mr. Arthur Crow, Mr. E. A. Gruning, Mr. G. T. Hine, Mr. Arthur Cates, and Mr. Aston Webb. To fill the vacancies caused by these retirements, the Council have the pleasure to nominate Sir Arthur W. Blomfield, Colonel R. W. Edis, Mr. Edwin T. Hall, Mr. T. M. Rickman, and Mr. R. A. Briggs.

The Council, in closing their Report, desire to express their sense of the indebtedness of the Society to the Royal Institute of British Architects for office accommodation, &c., and to the officers for their always helpful courtesy.



Durham Cathedral, Nave. (From a photo. by Mr. C. C. Hodges.)

THE BEGINNINGS OF GOTHIC ARCHITECTURE.

By John Bilson [*F.*], F.S.A.

II.* NORMAN VAULTING IN ENGLAND.

Read before the Royal Institute of British Architects, Monday, 20th March 1899.

THE revival of architecture in Normandy seems to have commenced under Duke Richard II., in the early years of the eleventh century. Originally sharing the characteristics of "primitive" Romanesque in Western Europe generally, Norman Romanesque soon develops a strongly marked individuality, and, in the middle of the eleventh century, begins to show its superiority over the architecture of the neighbouring provinces.† At the time of the Conquest of England the style had not advanced very far, but it contained the germs of vigorous development. Perhaps its most striking characteristic is the strictly logical relation between arches and vaults and their supports. The design of the building is the consistent expression of its structure. There is already a pronounced tendency to accentuate the membering of pier and arch. This tendency leads naturally enough to the numerous orders into which the arches and piers are divided in the first half of the twelfth century, and at a later period to the rich arch mouldings which are so characteristic of English Gothic, even in its earliest phase. Their severely logical plans prove that the Normans aimed at nothing less than covering all parts of their churches with stone vaults. The aisles of some of their churches were already so covered at the time of the Conquest, though few aisle vaults in Normandy have survived which can be assigned to an earlier date than 1050.* They had not yet succeeded in vaulting the principal spans of their churches, but a few choir vaults prove that this was accomplished before the end of the eleventh century.

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* See Part I. "Review of Recent Discussion," *ante*, p. 259.

† *L'Architecture normande*, by V. Ruprich-Robert, p. 6. *Die Kirchliche Baukunst des Abendlandes*, by G. Dehio and G. von Bezold, i. 278 *et seq.*

We know but little of the larger English churches which immediately preceded the Norman Conquest, but the available literary evidence tends to show that some of the Norman methods were already in use. We are not justified, however, in believing that the design of these English buildings was marked by the logical precision which is so characteristic of Norman work, or that the English had taken any step in the direction of vaulting over their churches. The persistence of the tradition of the wood ceiling, which England doubtless shared with the rest of North-Western Europe, is indicated clearly enough by the great cylindrical piers of the main arcades, such as we find at Gloucester, Tewkesbury, and Southwell—a type unknown in Normandy, except in a few churches of quite minor importance. It is not unlikely that English tradition may also account for certain features in the plans of some of the larger Norman churches in England which are not to be found in those of Normandy, where there is a much closer adherence to a single type of plan. In point of detail the same tendency is marked, soon after the Conquest, by the substitution of the cushion capital for the volute capital which was then almost universally used in Normandy.†

In studying the development of vaulting as illustrated by English examples between the Norman Conquest and the middle of the twelfth century it will be convenient to deal first with the vaults of the lower parts of churches, such as aisles and crypts, not only because we have earlier examples of these vaults, but also because their consideration is not complicated by the question of abutment, which is so important a factor in the construction of vaults over the principal spans. It is the groined vault alone which we have to consider. The Normans scarcely ever used the barrel vault over the more important parts of their churches. The barrel vault over the main span of the chapel in the Tower of London is quite an exceptional example.

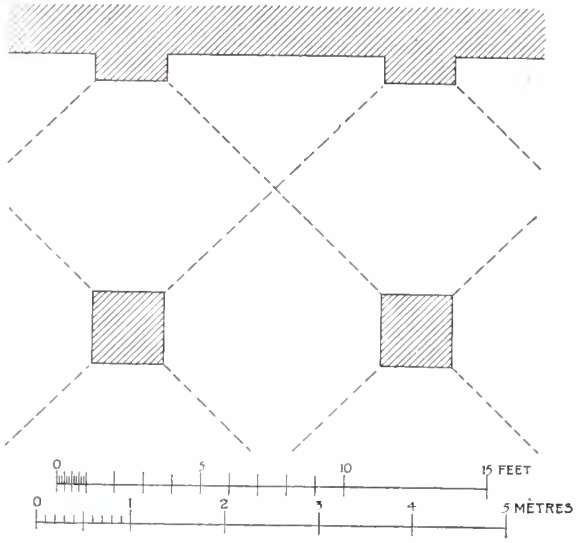

FIG. 1.—DURHAM, UNDERCROFT OF REFECTORY.

The groined vault ‡ in its simplest form results from the intersection of two semi-cylindrical vaults at right angles to one another, without transverse arches—a survival, in fact, of the Roman groined vault. The nave aisles of Sainte-Trinité, Caen, are covered with vaults of this kind, which, however, occur more frequently in crypts (*e.g.* Sainte-Trinité, Caen, and Bayeux). In England we have examples of this method of vaulting in the undercroft of the refectory at Durham, constructed during the exile of bishop William of Saint-Calais (1088–1091),§ where the vault is supported by square piers (fig. 1), and in the crypt under the choir of Rochester Cathedral (built by bishop Gundulf, 1077–1082), where the supports are cylindrical shafts.*

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* *L'Architecture normande*, p. 60.

† In some of the earlier churches in Normandy we occasionally find cubic capitals in which the square is gradually rounded off to the circular section of the shaft, or where the angles of the square are bevelled off (as in the nave of Jumièges); but these capitals do not show the semicircular line on the face of the cushion capital so common in England, and it is certain that capitals of the latter type were in use in England before the Conquest.

‡ I shall use the term *groined vault* to mean the groined vault without ribs, and the term *ribbed vault* as signifying the groined vault with ribs.

§ *Durham Cathedral*, by the Rev. William Greenwell, 5th ed., p. 21.

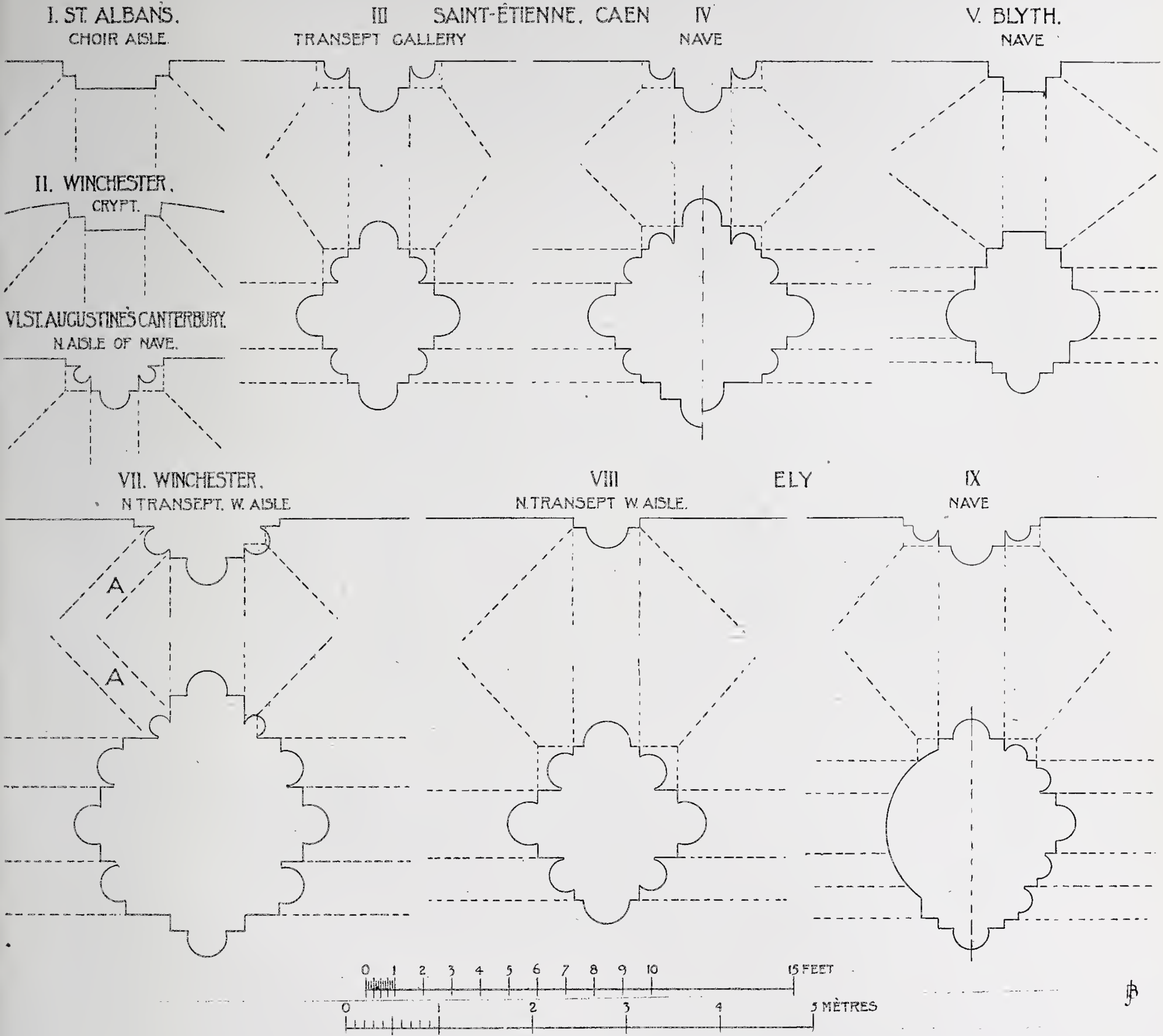

FIG. 2.—PLANS OF PIERS.

Generally, however, these groined vaults are banded by semicircular transverse arches, which are usually of simple square section, and form a kind of permanent centering to the vault.† The adoption of these transverse arches, however, involved considerable inconvenience in the construction of the springing of the groin. In the Roman groined vault and its imitations the groin springs from the *external* angle of the pier or pilaster. In many of the early Norman vaults the groin springs either from the *internal* angle formed by the junction of the transverse arch at its springing with the wall-face, or from the face of the wall or arch close to the angle.* As the vaults were constructed of rubble masonry with thick joints and covered with plaster, this method of springing the groin was obviously defective as a matter of construction. Consequently we find the difficulty met at a very early date by a further development in the membering of the supporting pier; the pilaster which carries the transverse arch is flanked on each side by a secondary pilaster which affords an independent support for the groin.† This method is followed in the undercroft of the dormitory at Westminster Abbey (a continuation of the Confessor's work, probably dating about 1070–1080), where the pier and groin are continuous without impost.‡ Other examples (with moulded impost) are the aisles of St. Albans (commenced by abbot Paul of Caen in 1077), fig. 2, i.; the crypt of Winchester Cathedral (commenced by bishop Walkelin in 1079), fig. 2, ii., and fig. 3; the aisles of the chapel in the Tower of London (*c.* 1080); the nave aisles of the priory church of Blyth, Nottinghamshire (founded 1088), fig. 2, v.; the crypt of Bow church, London; § and the choir aisles of St. Bartholomew's, Smithfield, founded as late as 1123.‖ In some crypts

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* *Gundulf's Tower at Rochester, and the First Norman Cathedral Church there*, by W. H. St. John Hope, *Archæologia*, xlix. 323.

† The boarded centering rested on the extrados of the transverse arches. In the crypt of Lastingham church, Yorkshire, this is proved by some fragments of the boarded

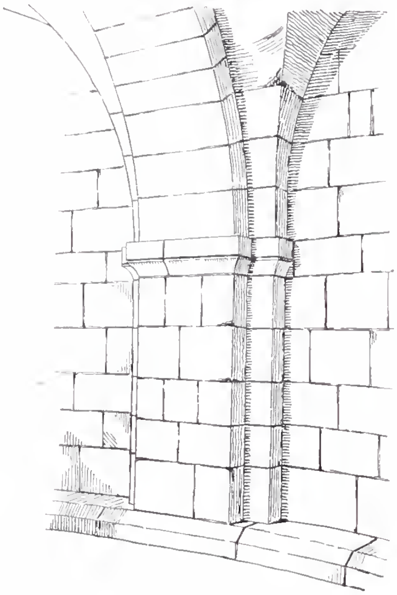

FIG. 3.—WINCHESTER, CRYPT.

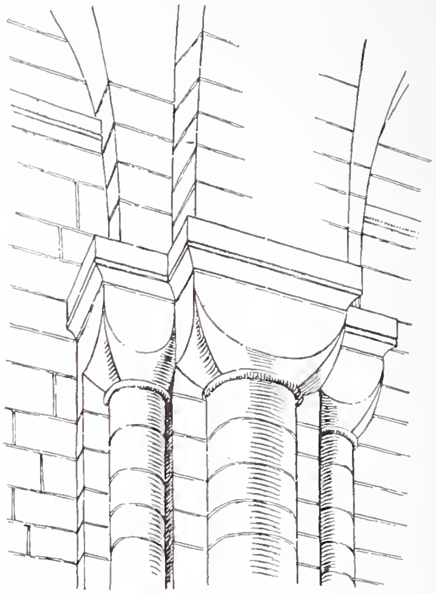

FIG. 4.—WINCHESTER, VAULT UNDER GALLERY OF NORTH TRANSEPT.

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centering which still remain. This crypt was built between 1078 and 1088 by the seceding monks from Whitby, who left the church at Lastingham unfinished, and founded the abbey of St. Mary, York.

* As in the nave aisles at Lessay (fig. 20), and in the choir and aisles of Saint-Nicolas, Caen, and Saint-Georges-de-Boscherville (fig. 24); see also the wall-pier in north transept of Ely Cathedral (fig. 2, viii.)

† The vaults in such early examples as Bernay and Jumièges already show an approach to this method. In the south choir aisle at Bernay the groin at its springing forms a projecting external angle, though the pier has no corresponding projection to receive it. In the nave aisles at Jumièges the wall-pier is a semi-cylindrical shaft flanked by a square projection on each side (as at Ely, fig. 2, viii.); the transverse arch, however, does not occupy the full width of the pier, but leaves the angles of the pilaster free to support the external angles of the groins at their springing.

‡ This applies to the wall-piers only. Over the cylindrical columns the groin springs from the internal angle between the arches, at a little distance above the capital. The arches are segmental curves struck from centres a little below the springing line.

§ *Vetusta Monumenta*, v. plate 64.

‖ In the undercroft of the dormitory at Westminster, where the vaulting is supported by single cylindrical shafts, the springing of the vault is subdivided in a similar manner, so as to give a separate projection for the springing of the groin; *e.g.* the crypt of Worcester Cathedral [*] (1084), the crypt of Ernulf's work at Canterbury Cathedral (*c.* 1096), and the chapel in the castle of Durham (commenced by the Conqueror in 1072).

A further advance consisted in the substitution of a shaft for the square pilaster which supported the groin. The vaults under the transept galleries at Saint-Etienne, Caen, are supported in this manner (fig. 2, iii.), and, although the vaults of the nave aisles of this church have been reconstructed at a later date,[†] the plans of the piers (fig. 2, iv.) clearly show that the same method was followed there.[‡] The same treatment occurs in bishop Walkelin's work in the transept aisles of Winchester Cathedral (fig. 2, vii. and fig. 4).[§] We find it also in the contemporary work of abbot Simeon (Walkelin's brother) in the transept aisles of Ely Cathedral, where, however, the shaft under the groin occurs only in the main piers and not in the wall-piers (fig. 2, viii.). The vaulting of the nave aisles of Ely [‖] follows the same method, except that the wall-piers throughout have a shaft under the groin (fig. 2, ix.), as at Winchester. In the north aisle of the nave of St. Augustine's abbey church, Canterbury, the groin is supported by a shaft (fig. 2, vi.), and Professor Willis suggests that the same treatment was adopted in the choir aisles of Ernulf's work in Canterbury Cathedral.[¶] Examples of this method are not very numerous, and it is scarcely likely that it was ever extensively adopted, for it was immediately superseded by the introduction of the diagonal rib.

In the vaults under the transept galleries at Saint-Etienne, Caen, and in bishop Walkelin's work at Winchester Cathedral (both in the crypt, fig. 3, and in the transept aisles, fig. 4),[**] we find an improvement in the construction of the vaults themselves. The haunches of the vault, for a short distance above the springing, are constructed of ashlar, above which the vault is of rubble, plastered. These advances in the construction of the groin springing and in the treatment of its supporting pier are worthy of attention as pointing in the direction of the far more important step which was taken when the rib was introduced. But before passing to this, my main subject, I must say a word on the modification of the simple groined vault necessitated by the oblong or irregular plan of the bays to be vaulted.

Whatever the shape of the space to be covered by an unribbed vault—whether an oblong, triangle, or trapezium—the Normans always aimed at keeping the crowns of the vault approximately level.[††] They accomplished this result by stilting the curves of the cells over the narrower spans. Sometimes these curves are simply stilted semicircles; sometimes the stilting lines slope inwards as they rise, so as to reduce the span of the semicircle; and more frequently the curve approaches more nearly to that of a tall semi-ellipse. The methods are irregular, for all is yet in the region of experiment. That the Normans had already, before the introduction of the rib, acquired considerable dexterity in vaulting bays of irregular plan

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the aisles of the chapel in the Tower, the crypt of Bow church, and the choir aisles of St. Bartholomew's, Smithfield, the vaults are supported on the side walls by wall arches which spring from inner pilaster projections. For illustrations of the chapel in the Tower, see *Vetusta Monumenta*, iv. plates 48–51.

[*] An excellent analysis of the vaulting of the crypt of Worcester Cathedral, by Professor Willis, is printed in the R.I.B.A. TRANSACTIONS for 1862–3, p. 213.

[†] *Analyse architecturale de l'Abbaye de Saint-Etienne de Caen*, by G. Bouet, Caen, 1868, pp. 32 and 34, and *Bulletin Monumental*, xxxi. 448, 450.

[‡] Also in the north aisle of nave of Saint-Taurin, Evreux.

[§] So also in the angles of the central part of Gundulf's crypt at Rochester (*Archæologia*, xlix.). In the angles of the aisles of this crypt the groins spring from a square pilaster.

[‖] Ruprich-Robert gives the date of the nave of Ely as 1174–1189. This can only apply to the upper part of the west end. The design of the nave must certainly be attributed to the time of abbot Richard (1100–1107), even if the greater part of it was not actually erected by him. See *The Architectural History of Ely Cathedral*, by the Rev. D. J. Stewart (1868), p. 38.

[¶] *The Architectural History of Canterbury Cathedral*, by Professor Willis (1845), p. 77.

[**] Also in the nave aisle vaults at Blyth (Notts).

[††] In England, at any rate, the Normans never appear to have adopted the expedient of raising the crown of the unribbed vault, so as to give the groin a semicircular form (Viollet-le-Duc, *Dictionnaire*, iv. 18).

is amply proved by the crypts of Winchester * and Worcester.† In the apse and ambulatory of the Winchester crypt the irregular shape of the bays and the skill exhibited in their vaulting are very remarkable. The arches are depressed curves rather lower than semicircles,‡ while, in order to bring the crowns to the same level, the wall-cells in the narrower bays assume a very tall elliptical curve. At Gloucester Cathedral (commenced 1089, dedicated 1100), in the narrow bay on the west side of the southern apsidal chapel, the wall-arch is actually a pointed arch, though the vault itself is slightly rounded over at the top (fig. 5). The extreme flexibility of their treatment of the unribbed vault clearly goes far to account for the early adoption and systematic development of the rib by the Norman builders.

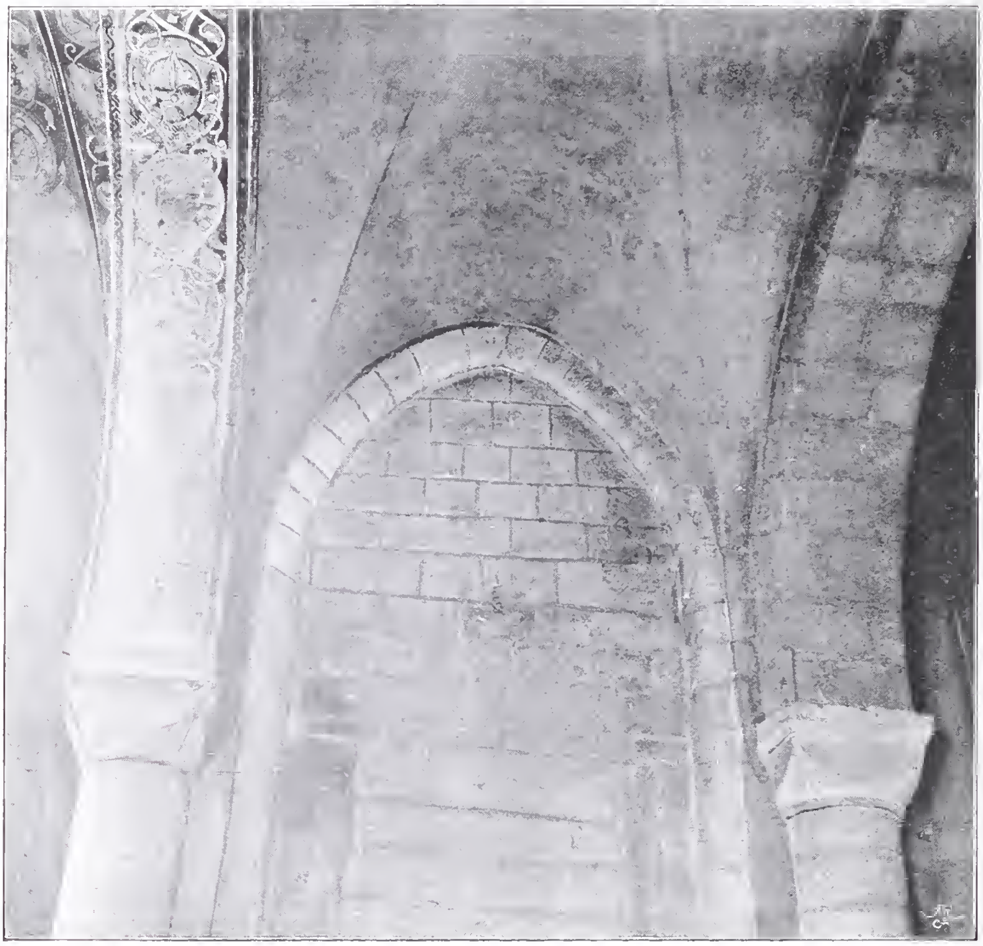

FIG. 5.—GLOUCESTER, SOUTH CHAPEL OF AMBULATORY, WEST SIDE.

The tall semi-elliptical curve § assumed by the lateral cells of unribbed vaults just mentioned is worth notice, because it shows that, before the introduction of the rib, the Norman builders were already modifying the curve of the lateral cells to suit the curve of the groin.

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* For plan of this crypt see Britton's *History and Antiquities of the See and Cathedral Church of Winchester* (1817), plate ii.

† Professor Willis, *ut sup.*

‡ Professor Willis speaks of them as ellipses, with a span of 15 feet and height of 6 feet. R.I.B.A TRANSACTIONS, 1862–3, p. 215.

§ Sir G. G. Scott (*Lectures on Mediæval Architecture*, i. 57) says that this curve was adopted, if at all, in occasional cases only, but I think that the examples which exist justify the interpretation of them here suggested. *Cf.* Ruprich-Robert, *L'Architecture normande*, p. 71.

Let us take the case of an unribbed vault over an oblong space A B C D (fig. 6), in which the curve of the vault over the longer side is a semicircle A E B, and in which the crowns of the vault are to be kept level. If the curve of the lateral cell is a stilted semicircle A F G, the groin will not lie in one vertical plane, but will assume an inflected line,* shown on plan by A H, B H. If, however, the groin is kept in one plane, represented by a straight line D H on plan, its curve will be a semi-ellipse D K, and this curve projected on the lateral wall will give a semi-elliptical curve D L G for the wall-cell. I do not suggest that these early vaults were constructed with mathematical exactness, but it seems to be clear that the elliptical curve was given to the wall-cell in order to keep the groin-line approximately in one plane. After the introduction of the rib, the wall-cells of oblong vaults generally assume the elliptical form, although in the earliest ribbed vaults the groin is no longer a semi-ellipse, but a segment of a circle struck from a centre below the springing line. The rib-curves henceforth control the construction, and the vaulting surfaces are adapted to them.

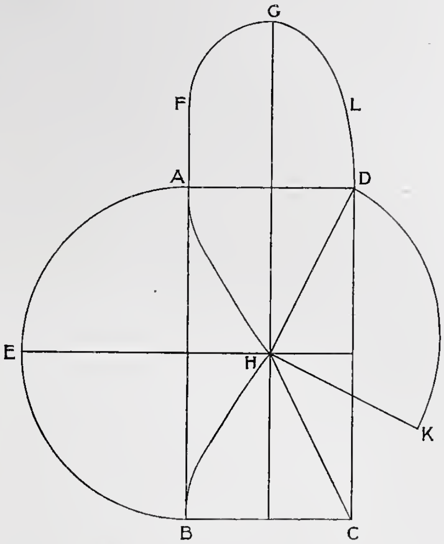

FIG. 6.

We have seen † that the ribbed vault makes its appearance towards the end of the eleventh century in districts widely separated geographically, from the north of Italy to Brittany. The history of the evolution of the rib lies outside the scope of this paper, which attempts only to deal with the story of its development in English examples. But wherever it first originated, or whatever the precise circumstances under which it was evolved, its advantage was obvious. It afforded a permanent centering for the groin, the weakness of which in vaults over wide spans must always have rendered them liable to failure. It completed the membering of the vault which had commenced when the transverse arch was added to the Roman groined vault. The Normans, before the end of the eleventh century, were already covering their choirs with simple groined vaults, of which there still remain a few examples, to be noticed presently. The introduction of the rib naturally commended itself to a school which had already shown such a decided tendency towards the multiplication of orders in arches and piers, and such skill in constructing unribbed vaults, and we need not be surprised to find that the new expedient was readily adopted and rapidly developed by the Normans, in England as well as in Normandy itself.

The cathedral church of Durham is not only the finest Romanesque building our country possesses, but it is also the most complete early example of the adoption of the ribbed vault in England. Every part of the church ‡ was covered with ribbed vaulting between 1093 and 1133. The proof of this statement, in view of the discussion summarised in the first part of this paper, is clearly a matter of the first importance. Fortunately, however, the documentary evidence, so far as it goes, is beyond question, for it is recorded by contemporary chroniclers, one of whom was certainly, and the other probably, a monk of Durham. The more important passages are quoted below,§ and they enable us to fix exactly certain stages in the progress of

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* See Professor Willis on the Worcester crypt vaults, R.I.B.A. TRANSACTIONS, 1862–3, p. 215 and pl. i.

† P. 261, above.

‡ Except, perhaps, the crossing, as to which we have no certain evidence, for the upper part of the central tower was rebuilt in the fifteenth century. The shafts which are carried up in each angle of the lantern were doubtless designed to receive the diagonal ribs of the crossing vault.

§ *Symeonis Monachi Dunhelm. libellus de exordio Dunhelmensis Ecclesiæ.* Ed. Thomas Bedford, London, 1732. Rolls Series, ed. T. Arnold, 1882–5. The references below are to the latter edition. Symeon's history ends in 1096, and that of his continuator in 1144.

"Ecclesiam xcviij anno ex quo ab Alduno fundata fuerat, the building. Soon after his return from exile bishop William of Saint-Calais pulled down Aldhun's church, and in the following year he commenced the erection of a larger and nobler structure. The foundation-stones were laid on the 11th August 1093. We have no documentary evidence as to the progress of the work when bishop William died on the 6th January 1096. We learn, however, that the bishop had undertaken the erection of the church, while the monks went on with the monastic buildings, and that, when the bishop's death put an end to this agreement, the monks devoted themselves to the works of the church, which, when Ralph Flambard became bishop in 1099, had advanced as far as the nave. Considering the great resources and energetic character of bishop William, and the much more limited means of the monks, we are justified in believing, what indeed is indicated by the character of the work itself, that the choir and east side of the transepts, as far as the top of the triforium, are the bishop's work, and that the west side of the transepts must be attributed to the monks. The choir was so far completed in 1104 as to permit the translation of the body of St. Cuthbert to the shrine at the east end. Flambard proceeded with the works *modo intentius modo remissius*, and this characteristic is illustrated by certain changes of design in the nave and upper part of the south transept. When Flambard died in 1128 he had carried up the nave as far as the vault. In the interval between his death and the accession of bishop Geoffrey Rufus in 1133, the monks completed the nave (*i.e.* they constructed the vault).

The plan * of the choir and east side of the transepts of Durham shows that it was the intention from the first to cover both the aisles and the main spans with the vaults which were actually constructed. The vaulting of the main spans will be considered presently. Let us examine first the vaults of the aisles, which were constructed under bishop William between 1093 and 1096. These vaults are shown in the general drawings of one bay of the choir (figs. 7, 8, and 9 †), and in the detailed plan (fig. 10), on which the curves of the ribs are developed.‡ The transverse and diagonal ribs of the vault are received by triple shafts on the aisle wall and on the back of the major and minor piers of the great arcade, each rib being supported by its own shaft. The plan of each bay of the choir aisles is a pronounced

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destrui præcepit, et sequenti anno positis fundamentis nobiliori satis et majori opere aliam construere cœpit. Est autem incepta M.xciij Dominicæ incarnationis anno, pontificatus autem Willelmi xiij ex quo autem monachi in Dunelmum convenerant xj tertio Idus Augusti, feria v. Eo enim die Episcopus, et qui post eum secundus erat in ecclesia Prior Turgotus cum cæteris fratribus primos in fundamento lapides posuerunt. Nam paulo ante, id est, iv. Kal. Augusti feria vj, idem Episcopus et Prior, facta cum fratribus oratione ac data benedictione, fundamentum cœperant fodere. Igitur monachis suas officinas ædificantibus, suis Episcopus sumptibus ecclesiæ opus faciebat." —*Symeon*, i. 128–9.

Of Flambard the continuator says: "Circa opus ecclesiæ modo intentius modo remissius agebatur, sicut illi ex oblatione altaris et cœmeterii vel suppetebat pecunia vel deficiebat. His namque sumptibus navem ecclesiæ circumductis parietibus, ad sui usque testudinem erexerat. Porro prædecessor [Willelmus de S. Carilefo] illius [Rannulfi], qui opus inchoavit, id decernendo statuerat, ut Episcopus ex suo ecclesiam, monachi vero suas ex ecclesiæ collectis facerent officinas. Quod illo cadente cecidit. Monachi enim omissis officinarum ædificationibus operi ecclesiæ insistunt, quam usque navem Rannulfus jam factum invenit."—*Continuatio*, i. 139–140.

After Flambard's death: "Vacavitque episcopatus per quinquennium. Eo tempore navis ecclesiæ Dunelmensis monachis operi instantibus peracta est."—*Continuatio*, . 141.

* For plan of the cathedral, see *Architectural Illustrations and Description of the Cathedral Church of Durham*, by R. W. Billings, London, 1843, plates 3 and 4; and *The Builder*, lxiv. 427. For plan showing the original eastern termination of the choir, see *Archæological Journal*, liii. 9 (plate 2).

† Figs. 7 to 12 all illustrate the western half of the eastern double bay of the choir (north side). On figs. 7 and 8 the existing vault of the choir, which was erected in the middle of the thirteenth century, is omitted, and a few other alterations are suppressed. The springing of the thirteenth-century vault, its wall-ribs (A, A, A), and the shafts which receive them are shown by dotted lines on fig. 7. The joints in the masonry of the clerestory at B B and C C (fig. 7) show the line of the original vault of the choir. The capitals of the triple vaulting shaft at D (fig. 7) were carved in the thirteenth century when the existing vault was constructed, but the corresponding capitals in the western double bay remain unaltered. The vaulting shaft at E (fig. 7) has been cut away for the choir stalls, which cover the face of the pier below, where no joints are shown. The present aisle floor level represents the original floor level of the choir (*Archæological Journal*, liii. 6). The north aisle windows are later insertions; that shown by dotted lines on the section at F (fig. 8) is supplied from the transept aisle. The bench table added in the north aisle by bishop Skirlaw (1388–1405) is shown by dotted lines at G (fig. 8).

‡ In the plans of vaults which illustrate this paper, the centre line of the rib on plan represents the springing line on which the rib-curve is set up.

FIG. 7.

DURHAM CATHEDRAL.

ELEVATION OF BAY OF CHOIR, NORTH SIDE

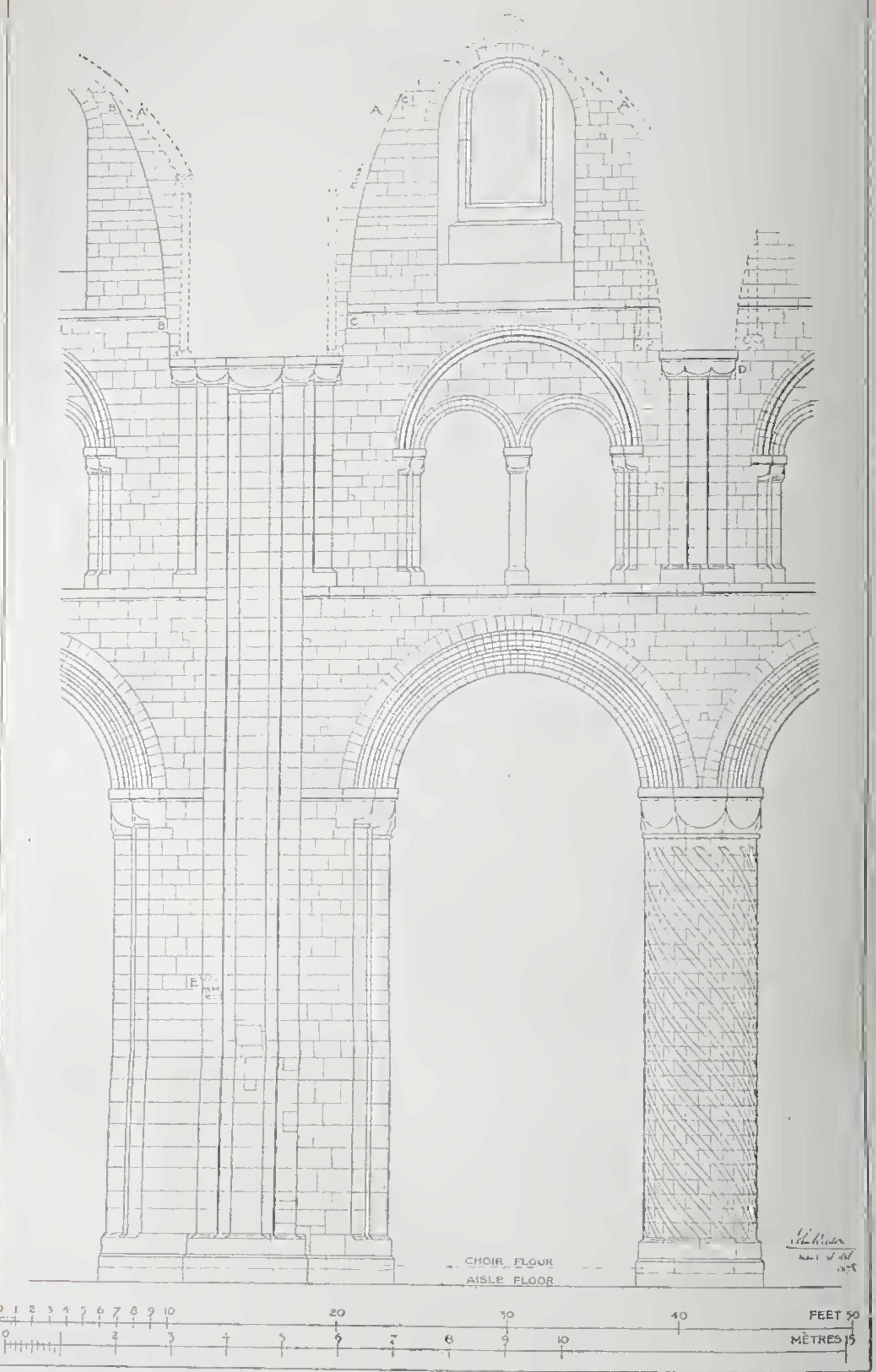
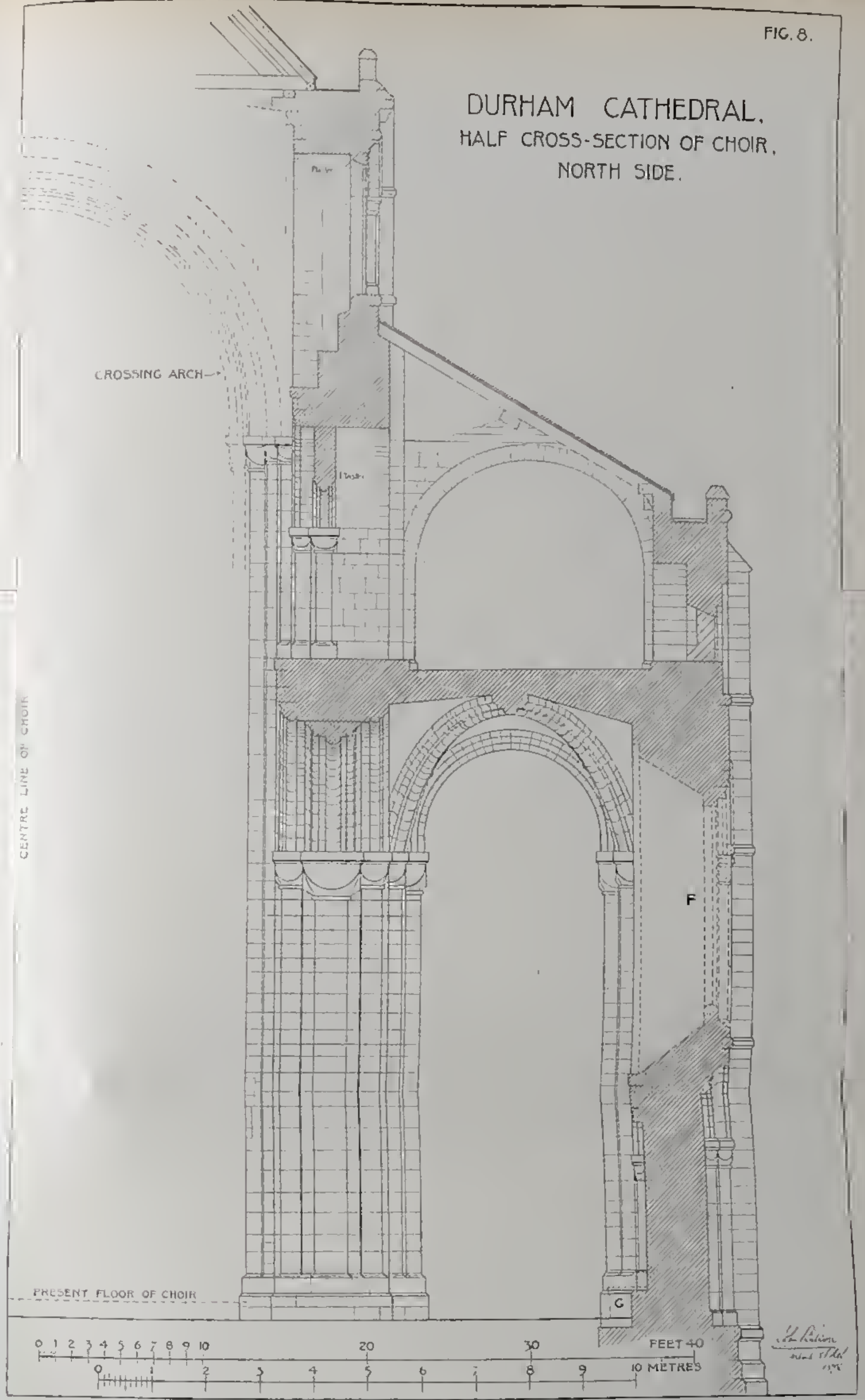

A
B
C
D
E
CHOIR FLOOR
AISLE FLOOR
0 1 2 3 4 5 6 7 8 9 10 20 30 40 FEET 50
0 1 2 3 4 5 6 7 8 9 10 METRES 15

FIG. 8.

DURHAM CATHEDRAL.

HALF CROSS-SECTION OF CHOIR,

NORTH SIDE.


CROSSING ARCH
CENTRE LINE OF CHOIR
F
G
PRESENT FLOOR OF CHOIR
0 1 2 3 4 5 6 7 8 9 10 20 30 FEET 40
0 1 2 3 4 5 6 7 8 9 10 METRES

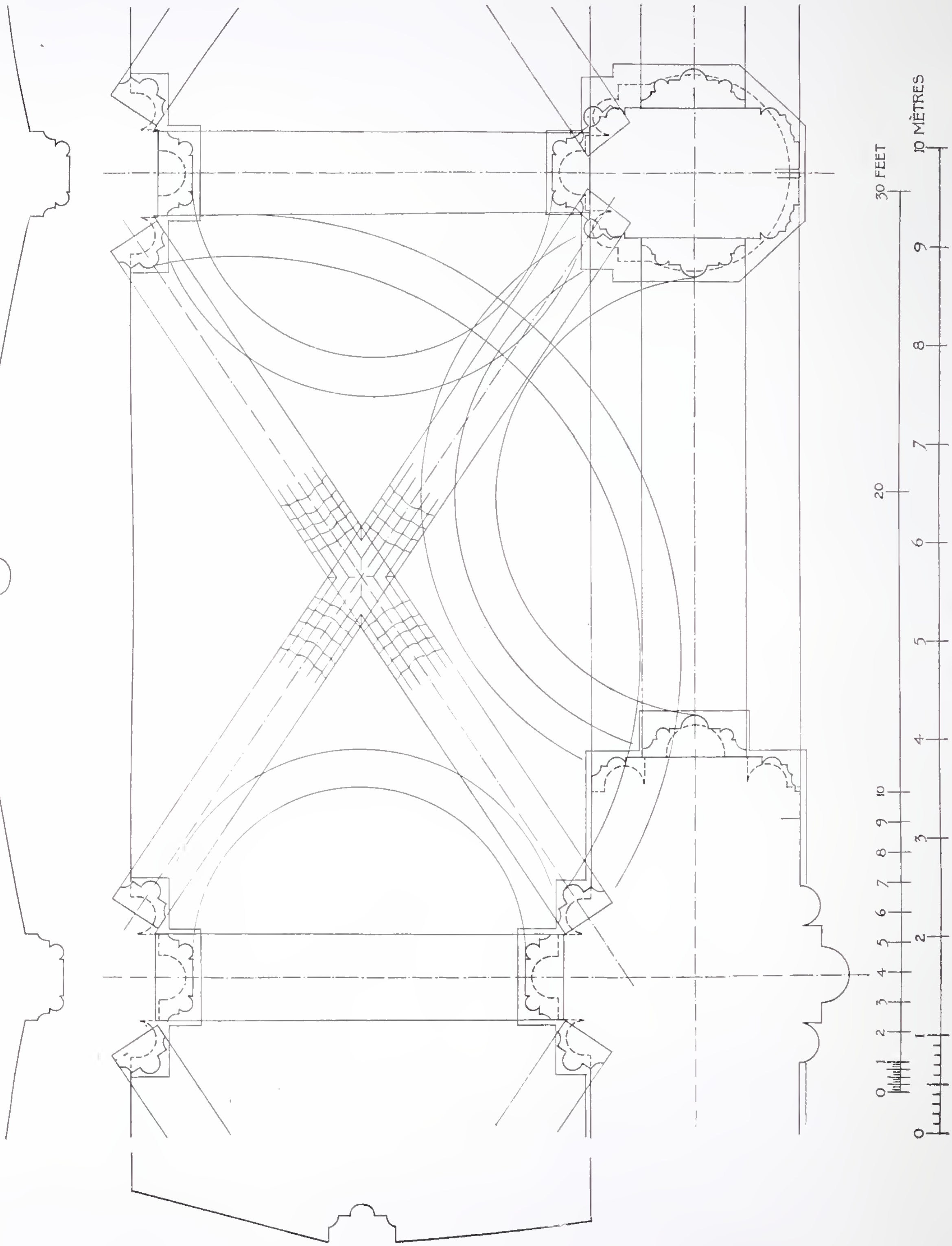

0 1 2 3 4 5 6 7 8 9 10 20 30 FEET
0 1 2 3 4 5 6 7 8 9 10 MÈTRES

FIG. 10.—DURHAM NORTH AISLE OF CHOIR. PLAN OF VAULT.

oblong,* the length from east to west being much greater than the width from north to south. The span of the diagonal rib is consequently more than double the span of the transverse rib. The arcade arches are practically semicircular; that in the bay illustrated is struck from a centre about 8 inches below the springing line. The span of the transverse arch at the back of the minor pier is a little greater than the span of that at the back of the major pier; consequently, while the former is a semicircle, the latter is a semicircle stilted about 10 inches. The curves of the diagonal ribs are segments of circles, struck from centres about 4 feet 9 inches below the springing line, and the ribs consequently leave the capitals at a very abrupt angle. The keys of the diagonal ribs are placed considerably above the crowns of the transverse arches, and all the cells of the vault at the crown slope upwards towards the keys of the diagonal ribs.† The vault curves on the side walls are lower than semicircles, that on the aisle wall considerably lower. The vault curve on the main wall of the choir is not concentric with the arcade arch, owing to the great width of the major pier, which causes a spandrel of wall to be left between the arch and the vault on the side next the major pier. It is important to notice that, unlike the groin of an unribbed vault, the curve of the rib here is not determined by the intersection of the vaulting cells; on the contrary, the rib is set out independently, and its curve determines the curves of the cells.‡ This is shown in a marked manner in the cells next the side walls (aisle wall and choir wall), where the surface of the cell is twisted to a very considerable extent—a necessary consequence of the fact that the centre from which the diagonal rib is struck is at a much lower level than the centres of the vault curves on the side walls. The section of the transverse arch shows a roll and hollow on each edge; that of the diagonal rib is a large roll between two hollows. The mouldings of the diagonal ribs do not clear themselves well at the springing, especially on the minor piers of the main arcade (see figs. 10, 11, and 12). The ribs, like the arches generally, are constructed of thin stones, averaging about 7 inches in thickness. The keys of the diagonal ribs are jointed in a primitive fashion; the sides of the keys are not shouldered for the ribs, but the joints continue the lines of the sides of the ribs, and stones of nearly triangular shape are introduced next the key to bring the next joint square with the rib (fig. 10).§ The vaults have no wall-rib or wall-arch. The vaults of the transept aisles are exactly like those of the choir aisles, except that the plans of the bays are of different proportions. All these aisle vaults are clearly part of the original work; the masonry and mouldings correspond in character with those of the choir arcades, and, for constructional reasons, the aisle vaults must, as usual, have been erected along with the main walls. It has been suggested that the vaulting shafts may have been planned to receive the unribbed groins of vaults like those at Winchester and Ely, and that the actual vaults at Durham are reconstructions; but the structure of the vaults themselves does not afford the least ground for such a conclusion, which is moreover emphatically contradicted by the plan of the vaulting-shafts at the angle between the choir aisle and transept aisle, both on the north and south sides. In the choir aisle triple vaulting-shafts receive the three ribs of the vault, as elsewhere; in the transept aisle two shafts only were required, since the diagonal rib of the bay of junction was already provided for, and the plan of the wall-pier was modified accordingly by the omission of the

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[*] Except the western bay, which is more nearly square, its width being governed by the width of the transept aisle. The other bays of the choir are set out nearly equally to the centres of the piers.

[†] The sections of the vault at the crown are shown in fig. 10. In the bay illustrated the surface of the vault cells at the keys of the diagonal ribs is about 8 inches above the crown of the vault on the choir wall (over the great arcade), 1 foot 9 inches above the crown of the vault on the aisle wall, and 2 feet 3 inches above the crown at the transverse arches.

[‡] It is scarcely necessary to say that this fact alone proves that the ribs cannot possibly have been added under the groins of an unribbed vault.

[§] The keys of the other Norman vaults in the cathedral are constructed in a somewhat similar manner.

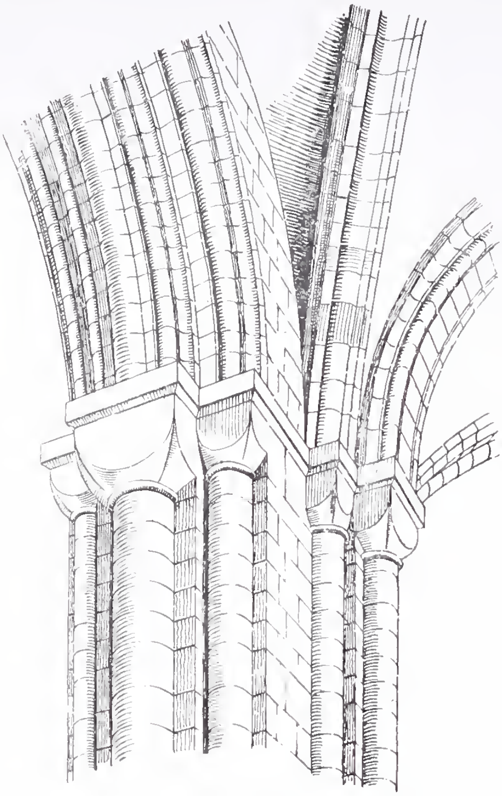

FIG. 11.—DURHAM, NORTH AISLE OF CHOIR. SPRINGING OF VAULT ON MAJOR PIER.

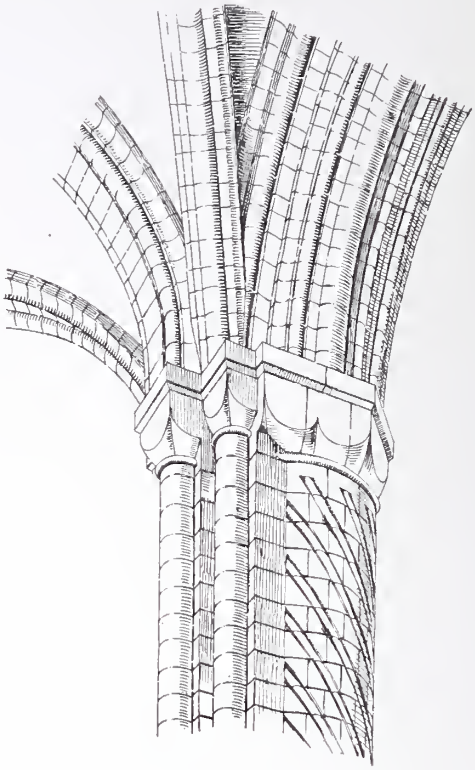

FIG. 12.—DURHAM, NORTH AISLE OF CHOIR. SPRINGING OF VAULT ON MINOR PIER.

unnecessary shaft (see fig. 13).* If unribbed vaults were intended, the obvious plan would have been to spring the groin from the angle of the wall itself, and it is not likely that the builder would have gone out of his way to create a difficulty in order to overcome it.

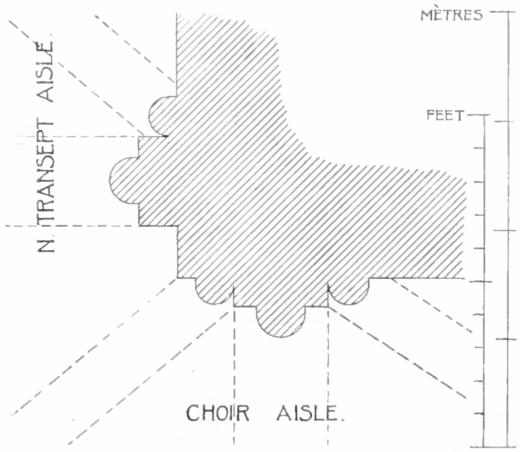

FIG. 13.—DURHAM, PLAN OF PIER AT ANGLE OF CHOIR AISLE AND TRANSEPT AISLE.

The vaults of the aisles of the nave of Durham are the work of bishop Ralph Flambard (1099–1128), and, as he completed the nave as far as the high vault, the aisle vaults may safely be attributed to the first twenty years of the twelfth century. They correspond in character with the aisle vaults of the choir and transepts, except in a few minor points. The supports on the back of the major piers and on the aisle wall opposite are triple shafts, as in the choir and transept aisles. The minor piers, however, are cylindrical, *without* any attached shafts to receive the ribs, and the corresponding piers on the aisle wall are half-cylinders. The spans of the transverse arches opposite the minor piers are consequently wider than those of the arches opposite the major piers, and the curves of the former are modified accordingly. The transverse arches throughout are of the same section as those in the aisles of the choir and transepts, as also are the diagonal ribs in the two easternmost bays. In the other bays the diagonal rib has a large roll with a chevron on each side, instead of a hollow. The vaults beneath the western towers, which are also Flambard's work, exhibit a variation which is worth notice. As the towers project considerably beyond the walls of the aisles, the diagonal ribs of the tower vaults have a greater span than those of the aisle vaults. The capitals of the shafts which receive the diagonal ribs are therefore placed at a lower level than the capitals which receive the arches opening into the nave and aisle (fig. 14),* in order to give greater height to the diagonal rib by thus lowering its springing. The same expedient was adopted in Suger's work at Saint-Denis in the vaults beneath the western towers (1137–1140), where, however, the arches are all pointed.†

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* The same method was followed, at a much later date, at the angles of the choir and transept aisles of Lisieux Cathedral.

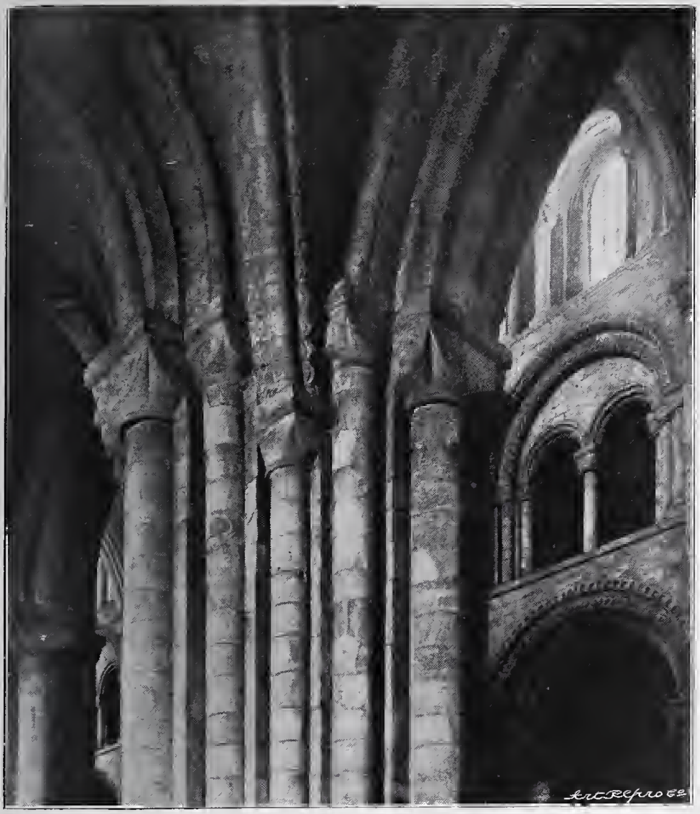
FIG. 14.—DURHAM, VAULT UNDER NORTH-WEST TOWER.

Our next dated example of ribbed vaulting is to be found in the reconstructed parts of the transepts of Winchester Cathedral. The original work in these transepts (noticed above) belongs to the church which bishop Walkelin commenced in 1079, and which the monks entered in 1093. The central tower fell in 1107,‡ and the works of reconstruction which were necessitated by this catastrophe can be readily distinguished from the original work by the different thickness of the joints of the masonry, which in Walkelin's work are very thick, whereas the reconstructed masonry is close-jointed.§ In the reconstructed bays of the transept aisles the vaults were entirely rebuilt as ribbed vaults, the diagonal ribs springing from the shafts which originally received the projecting groins of the unribbed vaults (fig. 2, vii., in which A A are the diagonal ribs of the reconstructed vault). As at Durham, the curve of the diagonal rib is a segment of a circle struck from a centre below the springing level. The crowns of the vaults are practically level. The section of the rib shows a large roll flanked by small hollows—a similar section to that used in the Durham aisle vaults, but more refined in detail.‖ The ribs are of thin stones, and close-jointed. The keys are shouldered to receive the ribs, which abut against them with a joint at right angles to the direction of the rib. In the northernmost bay of the east aisle of the north transept, which would not be affected by the fall of the tower, the vault itself does not appear to have been rebuilt, but the ribs seem to have been added under the original vault, and are backed out up to the groins.* With regard to the date of these ribbed vaults, we cannot doubt that, in a church so important as Winchester, the monks would immediately undertake the repair of the damage caused by the fall of the tower, and we are justified in dating the vaults within two or three years from 1107, the year in which the tower fell.†

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* I am indebted to Mr. J. Freeman, verger of the Cathedral, for kindly taking this photograph specially for me. See also Billings' *Durham Cathedral*, pl. 42.

† *Die Kirchliche Baukunst des Abendlandes*, pl. 153, fig. 8.

‡ "Anno Mcvii. Turris ecclesiæ ejusdem cecidit nonas Octobris." *Annales Monasterii de Wintonia*, in *Annales Monastici* (Rolls Series, ed. H. R. Luard), ii. 43.

§ *The Architectural History of Winchester Cathedral*, by Professor Willis, Archæol. Inst., Winchester vol., p. 25.

‖ The diagonal ribs in the Durham aisle vaults are 22 inches wide, and those at Winchester 14 inches wide.

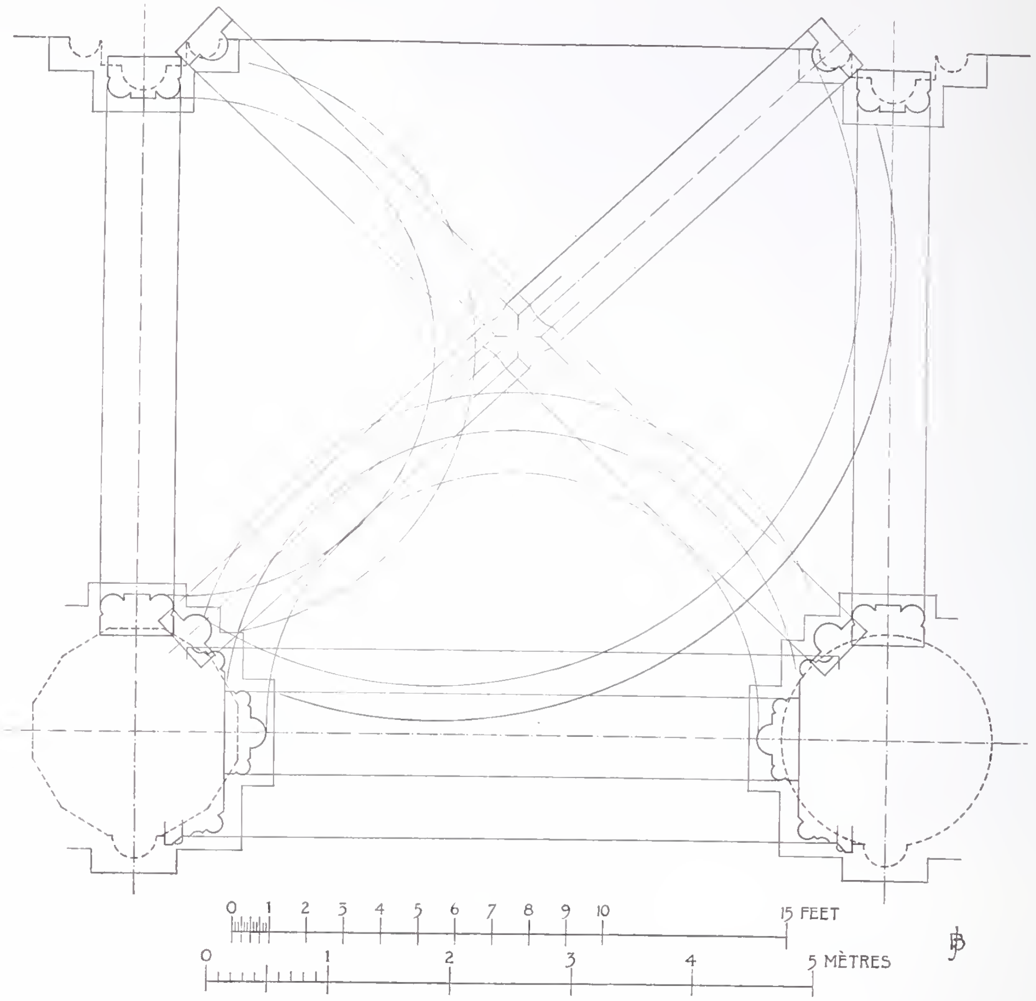

FIG. 15.—PETERBOROUGH, SOUTH AISLE OF CHOIR. PLAN OF VAULT.

Peterborough Cathedral presents examples of ribbed vaults, the date of which is proved by documentary evidence. The earlier church was destroyed by fire in 1116, and the present building was commenced in 1117 or 1118.‡ In 1140 or 1143 (both dates are given by

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[*] Professor Willis's statement (p. 25, *ut sup.*), as to the bays in the north transept aisles which have ribbed vaults, is not quite correct. The bays marked C and J on his plan (fig. 36) have ribbed vaults. In the bay H I think that the ribs have been added under the original vault. The bays D, E, F, and G have the original unribbed vaults. In the bay I the ribs are a fourteenth-century reconstruction.

[†] M. Félix de Verneilh (*Annales Archéologiques*, xxiv. 234) quotes Professor Willis to show that these vaults are of later date than the original structure, but he does not mention the date of the fall of the tower, which necessitated the reconstruction of the vaults in question—a date which certainly does not suit his conclusions.

[‡] "An. Mcxvi. In this same year all the minster of Burh was burnt." (*Anglo-Saxon Chronicle*, Rolls Series, ed. Benj. Thorpe, i. 371, ii. 213.)

"Mcxvi. Tota ecclesia et villa combusta est. . . . In different chroniclers *) the monks entered the new church. The parts then completed include the choir and east side of the transepts (except, perhaps, the clerestories). The aisles of the choir and transepts throughout are covered with ribbed vaults (fig. 15). The transverse and diagonal ribs are supported by triple shafts on the aisle wall (fig. 17). The piers of the main arcades are circular and polygonal, and their capitals are subdivided so as to provide a separate corbel for each order of the arch and each rib of the aisle vault (fig. 16). Both the arcade arches and the transverse ribs of the aisle vaults are semicircles, slightly stilted. The diagonal ribs are segments of circles struck from centres below the springing line, the crowns of the vaults being practically level. The vault cells at the back of the diagonal ribs are considerably twisted at the springing, though not to the same extent as at Durham, as the plan of the bay here more nearly approaches a square. The transverse ribs have a roll on each edge, and the diagonal ribs a large roll flanked by a flat on each side.† These vaults have no wall-ribs.

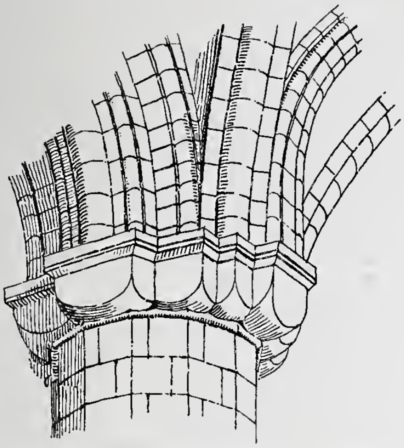

FIG. 16.—PETERBOROUGH, SOUTH AISLE OF CHOIR.

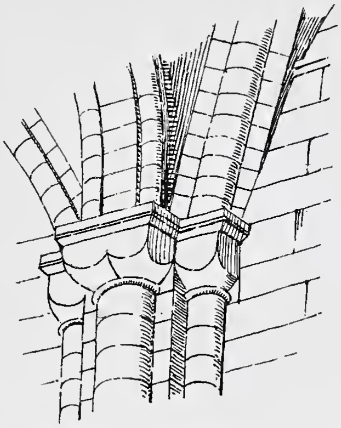

FIG. 17.—PETERBOROUGH, NORTH AISLE OF CHOIR.

It is necessary here to examine M. Félix de Verneilh's conclusions ‡ with regard to these vaults, since they appear to be the authority for M. Lefèvre-Pontalis' statement that the ribs at Peterborough were added afterwards, in the second half of the twelfth century. § M. de Verneilh, after noticing that the aisles of Romanesque churches in England are covered with unribbed groined vaults, asserts that, from motives of pure embellishment, ribs were introduced under the groins of primitive vaults, or these vaults were entirely rebuilt, without

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alio autem anno ipse abbas inchoavit novam ecclesiam, et jactavit fundamentum octavo idus Martii, anno ab Incarnatione Domini millesimo centesimo decimo octavo, et multum operatus est in ea, sed non complevit." (*Hugonis Candidi Cœnobii Burgensis Historia*, p. 72, printed in Sparke's *Historiæ Anglicanæ*.)

"Mcxvi. Monasterium Burgi, cum magna parte villæ adjacentis, combustum est secundo nonas Augusti, die Veneris." "Mcxvii. Fundamentum novæ ecclesiæ Burgi ponitur quarto idus Martii." (*Chronicon Angliæ per Johannem Abbatem Burgi S. Petri*, p. 64, in Sparke's *Historiæ Anglicanæ*.)

* "Martin, abbot, . . . brought them [the monks] into the new minster on St. Peter's mass-day, with great worship. That was anno ab incarnatione Dom. Mcxl, a combustione loci xxiii." (*Anglo-Saxon Chronicle*, i. 383, ii. 232.)

"Mcxl. Martinus autem abbas sub isto rege . . . multa operatus est, et presbyterium ecclesiæ perfecit . . . monachos in die festivitatis Sancti Petri in novam ecclesiam cum magno gaudio introduxit." (Hugo Candidus, p. 76.) Martin was abbot from 1133 to 1155.

"Mcxliii. Conventus Burgi hoc anno intravit in novam ecclesiam." (*Chron. per Johannem*, p. 75.)

"Mcxliii. Conventus Burgi intravit novam ecclesiam." (*Chronicon Petroburgense*, Camden Soc., ed. Thomas Stapleton, p. 2.)

† The gateway to the west of the church has a very similar vault.

‡ *Le Style ogival en Angleterre et en Normandie*, by Félix de Verneilh, *Annales Archéologiques*, 1864, xxiv. 232 *et seq.*

§ E. Lefèvre-Pontalis, *op. cit.* i. 89 .

any change being made in the form or direction of their supports; thus the capitals and bases of the shafts which receive the springings of the ribs, instead of facing in the direction of the rib, present their angles in that direction. He seems to have been led to doubt the authenticity of the earliest ribbed vaults in England (including these at Peterborough) by the fact that the capitals under the diagonal ribs are usually set square instead of being set diagonally in the direction of the rib, as is generally the case in the Ile-de-France. He asserts that the latter method is constant in France, with very rare exceptions—such as one of the bays in Suger's narthex at Saint-Denis. These exceptions, however, are by no means so *infiniment rares* as M. de Verneilh suggests, for the capitals under diagonal ribs are set square, not anglewise, in several of the most important early examples in the Ile-de-France.* After examining the Peterborough vaults M. de Verneilh came to the conclusion that the supporting shafts were designed to receive the projecting groins of unribbed vaults, and that the actual ribs were added afterwards, because he thought he found that the arcade arches were continued down to the caps behind the springing of the diagonal ribs. What is actually done is that the diagonal ribs at their springing are fitted between the arcade arches and transverse ribs, as shown in fig. 18; † the back of the rib is not thinned off in the manner shown in M. de Verneilh's drawing. But in all these early ribbed vaults the ribs and arches are fitted together in this crude fashion,‡ and this fact is rather an argument *for* than *against* the date assigned to them, for we can only expect such crudities in first attempts. Since M. de Verneilh wrote, however, the central tower of Peterborough has been taken down and rebuilt, and an opportunity has consequently been afforded for ascertaining exactly how the aisle vaults were constructed. Mr. J. T. Irvine, the experienced clerk of works who superintended the work, assures me that no evidence whatever was found to support M. de Verneilh's theory. Apart, indeed, from the evidence of the structure itself the theory is untenable. The ribs cannot have been added under the groins of earlier unribbed vaults, for a simple geometrical reason. The groin of an unribbed vault is a semi-ellipse, but the actual curve of the rib is a segment of a circle. If the ribs had been added they must have been backed out to the elliptical curve of the groins; § but such is not the case. If, therefore, the ribs are later than their supports the vaults themselves must have been reconstructed. It is, however, too much to ask us to believe that all the original vaults of the choir aisles and transept aisles (fourteen bays in all) were removed within half a century from their construction without leaving any trace of their existence and without any sign in the structure itself of any failure or catastrophe such as might have necessitated their removal. That these Peterborough vaults are original is clear, too, from the fact that they do not stand

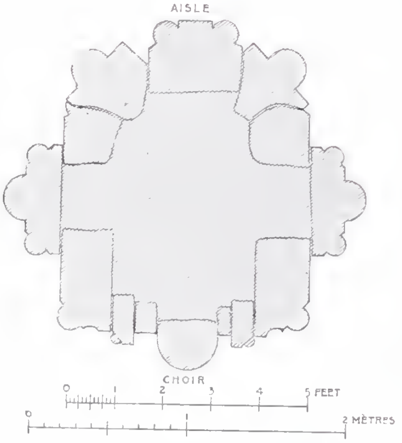

FIG. 18.—PETERBOROUGH, NORTH SIDE OF CHOIR. PLAN AT SPRINGING OF AISLE VAULT.

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* The capitals under diagonal ribs are set square in the following French examples:—Morienval (ambulatory), Saint-Denis (south-west tower and ambulatory), Sens Cathedral (choir aisles and nave aisles), Saint-Martin, Laon (choir), Noyon Cathedral (south transept and nave aisles, in part), Saint-Maclou, Pontoise (ambulatory), Saint-Germain des Prés, Paris (choir and ambulatory), Saint-Leu d'Esserent (ambulatory), Soissons Cathedral (south transept aisle).

† I am indebted to Mr. J. T. Irvine for this drawing. Violiet-le-Duc's drawing (*Dictionnaire*, iv. 102, fig. 54 *ter*) shows the rib and arcade arch as dying into one another in a single springer stone, which (as M. de Verneilh points out) is quite inaccurate. It was not until towards the end of the twelfth century that solid springers were introduced. Yet Viollet-le-Duc's drawing was reproduced without correction in an essay which recently obtained the R.I.B.A. Essay Prize.

‡ *Cf.* Lefèvre-Pontalis (*op. cit.* ii. 6) on the choir vault at Bellefontaine, where the ribs "viennent retomber maladroitement sur quatre colonnettes." The same awkward fitting is to be seen in the choir aisles (over the piers) of Laon Cathedral.

§ This is the case in the north-east bay of the north transept at Winchester.

alone, but are analogous in their method and construction to a large number of vaults which cannot all be the result of such an alteration as M. de Verneilh suggested.

Let us now pass to the consideration of examples of similar ribbed vaults, as to the date of which we have no documentary evidence, and to which only approximate dates can be assigned from the character of the work. One of the earliest of these examples is the vaulting over the north aisle of the nave of Gloucester Cathedral (fig. 19). The rebuilding of the abbey church was commenced by abbot Serlo in 1089, and the church was dedicated in 1100. Probably only the eastern part of the church was then completed, but we may safely assign the north aisle, with its vaulting, to the first twenty years of the twelfth century. The vaulting shafts on the aisle wall form groups of five; a semi-cylindrical attached shaft receives the transverse arch, which is semicircular, and of simple square section; the two shafts on each side, which receive the diagonal ribs and wall-arches, are of the quarter-round section which we find in the earlier work in the choir. The diagonal ribs are segments of circles struck from centres below the springing line; their section shows two rolls separated by an angular fillet. The wall-arches are considerably stilted. The bays of the vault are nearly square. In some bays of the ambulatory of the crypt (the original vaults of which are unribbed) the piers have been cased, and the vaults have been strengthened by the addition of diagonal ribs, some of which are square in section, while others show a large roll flanked by small hollows. The alterations seem to be contemporary with the north aisle of the nave. In the little church of Avening (Gloucestershire)* we find ribbed vaults, of *c.* 1120–1130, which seem to have been inspired from the early twelfth-century work at Gloucester. In the western bay of the chancel the diagonal ribs have a large roll flanked by small hollows, while those under the tower are of simple square section. In both these vaults the diagonal ribs spring from angle shafts, the capitals of which are set anglewise, in the direction of the rib.

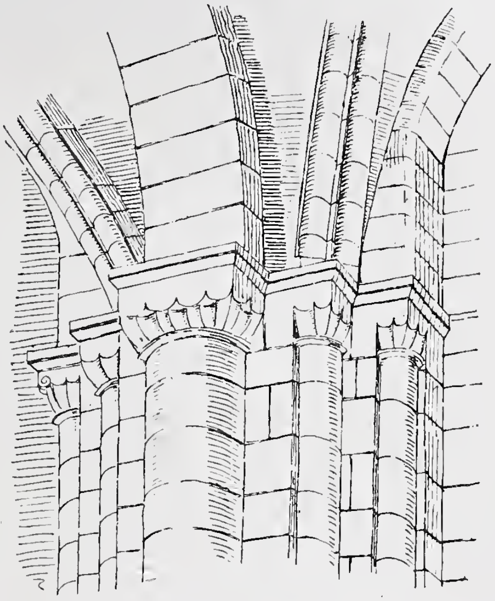

FIG. 19.—GLOUCESTER, NORTH AISLE OF NAVE.

The aisles of the nave of Southwell Minster are covered with ribbed vaults of *c.* 1120.† The transverse ribs are semicircles considerably stilted. The diagonal ribs are segments of circles struck from centres below the springing line, and, as the plan of the bay is a pronounced oblong, these ribs have a low sweep, and the vault cells at the back of them are considerably twisted at the springing. The ribs, both transverse and diagonal, have a roll on each edge separated by two angular fillets. There is no wall-rib.‡

The priory church of Lindisfarne was built by Ædward, who probably died near the end of Ralph Flambard's episcopate (1128).§ Reginald of Durham, who wrote *c.* 1165, tells us

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* A paper on this church, illustrated by plans, by R. Herbert Carpenter and B. Ingelow, is printed in the *Transactions of the Bristol and Gloucestershire Archæological Society*, xiv. 5–13.

† M. Lefèvre-Pontalis (*op. cit.* i. 89) says that these vaults are not earlier than the end of the reign of Henry I., but he gives no reason for this opinion. The only documentary evidence available is a letter of archbishop Thomas (no doubt Thomas II., 1109–1114) asking for contributions towards the erection of the church. The character of this part of the nave indicates a date of *c.* 1120 as most probable.

‡ For plan of Southwell Minster see *The Builder*, lxiii. 12; detail of springing of vault over main piers on p. 15.

§ *History and Antiquities of North Durham*, by Jas.

that Ædward erected in honour of St. Cuthbert a church new from its foundations, which he finished (*consummavit*) of squared stone, with all elegance of workmanship.* The church throughout was covered with ribbed vaults, and its design is an evident inspiration from Durham. The vaults of the main spans will be described presently. The piers of the nave arcades are alternately cylindrical and clustered; the ribs of the vaults of the north aisle (the vaults of the south aisle no longer exist) are supported by triple shafts alternating with attached semi-cylindrical shafts (as in the nave aisles of Durham), but the capitals of the latter shafts are subdivided to receive the three ribs—an advance on Durham, where the capitals of the corresponding shafts are semi-octagonal. The transverse ribs of the aisle vaults are semicircles stilted about two courses in height. The diagonal ribs were segments of circles struck from below the springing. The transverse ribs have a roll on each edge, and the diagonal ribs a roll between two hollows. There is no wall-rib.†

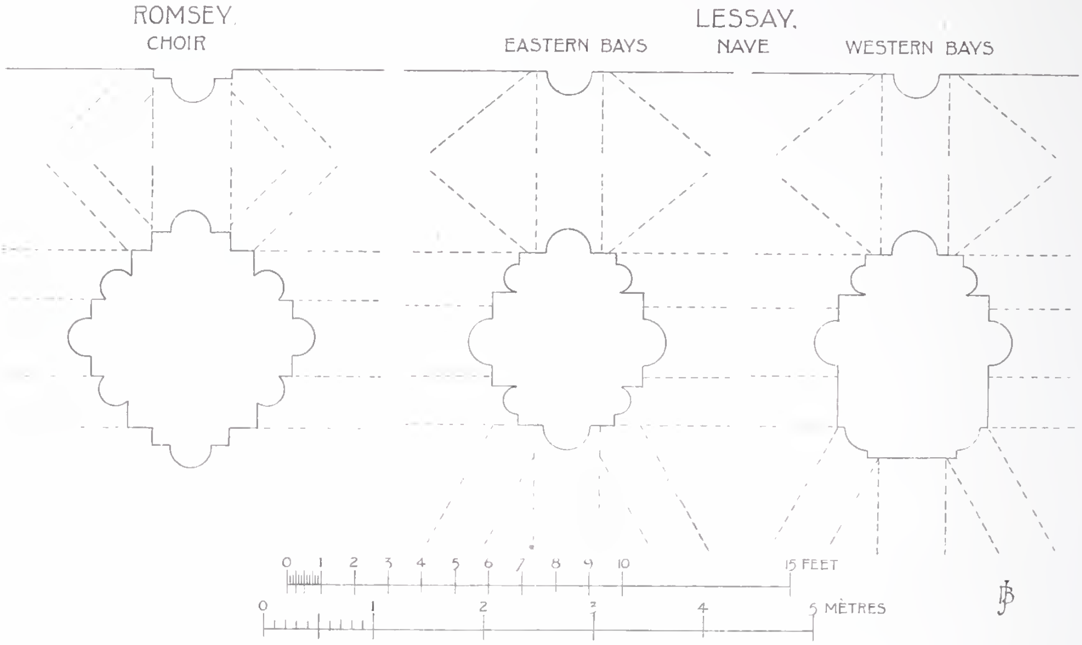

FIG. 20.—PLANS OF PIERS.

The nave of the abbey church of Dunfermline is another work which was clearly inspired by Durham. It was probably erected soon after the accession of David I. in 1124.‡ The ribbed vaults over the aisles correspond almost exactly in detail with those of the aisles at Lindisfarne. The eastern bays of the nave of Selby abbey church also afford marked indications of Durham influence.§ The piers of the nave arcades are alternately clustered and cylindrical, the latter having attached shafts at the back to receive the ribs of the aisle vault, which recall the arrangement in the choir of Durham, although the work here is of more advanced character. The original ribbed vaults remain over the two eastern bays of

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Raine, p. 74. The evidence as to the date of Ædward's death is not very conclusive. In the list of Durham monks his name immediately follows that of Symeon, the historian, who probably died shortly after 1130.

* *Reginaldi Monachi Dunelmensis Libellus*, &c., ed. Jas. Raine, Surtees Soc., vol. i. pp. 44, 45.

† For plan and description of the church see *The Builder*, lxviii. 414. The internal view shows the vaulting of the north aisle.

‡ *The Ecclesiastical Architecture of Scotland*, by David Macgibbon and Thomas Ross, i. 231, &c. The aisle vaults are illustrated in figs. 208, 210, and 212.

§ *The Architectural History of Selby Abbey* (with plan by C. C. Hodges, *Yorkshire Archæological Journal*, xii. 344

the south aisle. The support of the transverse rib at the back of the easternmost pier is a square pilaster, with two shafts separated by an angle fillet on its face. The semicircular transverse rib shows a similar section. The diagonal ribs, of segmental curve, have a large roll flanked by a flat on each side, and are supported by shafts on each side of the projection described above.*

The vaults of the choir aisles of Romsey abbey church are similar in their system to those already described. The supporting piers, however, were evidently designed for unribbed groined vaults; their plan shows a projecting pilaster with a single shaft on the face (fig. 20), the normal method of supporting the transverse arch of an unribbed vault. There is, therefore, no preparation for receiving the diagonal rib, which actually springs from a little corbel placed across the angle upon the abacus (fig. 21). Further west, in the later work, triple shafts are in some cases provided to receive the three ribs in the usual way.† At Lessay, in Normandy, the existing ribbed vaults over the choir, transepts, and eastern bays of the nave spring awkwardly from single shafts, which were clearly designed for unribbed vaults, such as were actually constructed in the aisles. In the western bays of the nave the plan of the pier was modified, by substituting for the single shaft a projecting pilaster with a quarter-round shaft on each edge (fig. 20), which afforded a more fitting support for the three ribs of the high vault. These examples are interesting as showing how the idea of the ribbed vault was introduced, during the course of construction, in works which were originally planned only for unribbed vaults.

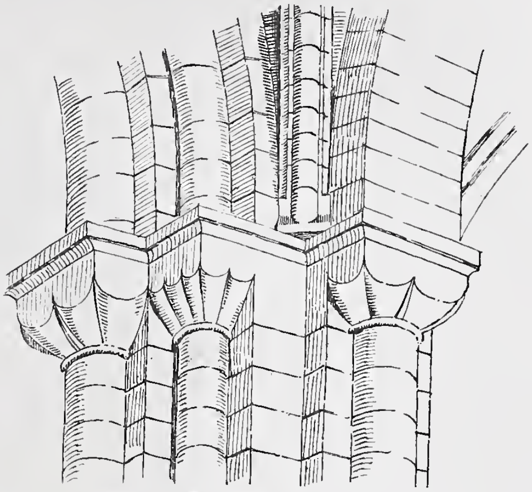

FIG. 21.—ROMSEY, SOUTH AISLE OF CHOIR.

The two churches at Devizes (Wiltshire) afford examples of aisleless chancels covered with ribbed vaults. These works may with some probability be attributed to the architectural influence of bishop Roger of Salisbury, and may be dated approximately at *c.* 1125–1130, St. John's being slightly earlier than St. Mary's. In each church the chancel is divided into two oblong bays. The transverse arch between the two bays is supported by coupled shafts, flanked by shafts which receive the diagonal ribs, with corresponding shafts in the angles of the east end. In St. John's church (fig. 22) the semicircular transverse arch is of square section, unmoulded, and the diagonal ribs have a large roll with a small hollow on each side. In St. Mary's church the transverse arch is moulded with two large rolls separated by a small angular fillet, and flanked by a small hollow and fillet; the diagonal ribs show a large roll with a small hollow and fillet on each side. The ribs are in narrow stones, and the keys are shouldered, as shown in fig. 22. There are no wall-ribs, and the lateral cells of the vaults show upright semi-elliptical curves on the side walls. In each case the crown of the vault at the key of the diagonal rib is a little higher than at the crown of the transverse arch—

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* It is scarcely necessary to point out how far these examples confirm what has been said above in contradiction of the theory that the Durham vaults are reconstructions.

† Even in the eastern part of the church, however, the method is not quite constant, for shafts are provided to receive the diagonal ribs at the western angles of the ambulatory across the east end of the choir itself, and also at the western angles of the choir aisles, next the transepts. In these vaults the transverse arches are of square unmoulded section, and the diagonal ribs show a roll between two small hollows (as at Winchester). No documentary evidence seems to be available as to the date of Romsey, but from the character of the work its commencement may be assigned to *c.* 1110. For plan and description of the church, see *The Builder*, lxix. 236.

one foot higher in St. John's church and five inches higher in St. Mary's church. We find here a tendency to improve the curve of the diagonal rib. In all the English ribbed vaults which have been noticed above, the curve described by the diagonal rib appears to be a segment of a circle, the centre of which is placed below the springing line. This curve is unsatisfactory in appearance, since the rib springs from the wall or pier at an awkward angle, and it is also objectionable as a matter of construction, because the lateral thrust of the rib is unnecessarily increased. Consequently we find in some later examples that, while the transverse arches still remain semicircular, the diagonal ribs describe a semi-elliptical curve.* In the chancel of St. John's, Devizes, the curve of the diagonal rib is only slightly quicker than a segment of a circle, but at St. Mary's the curve more nearly approaches a true semi-ellipse.† The vaulting of the south aisle of the nave of Dunstable priory church is a somewhat later example of the use of a semi-elliptical curve for the diagonal rib.

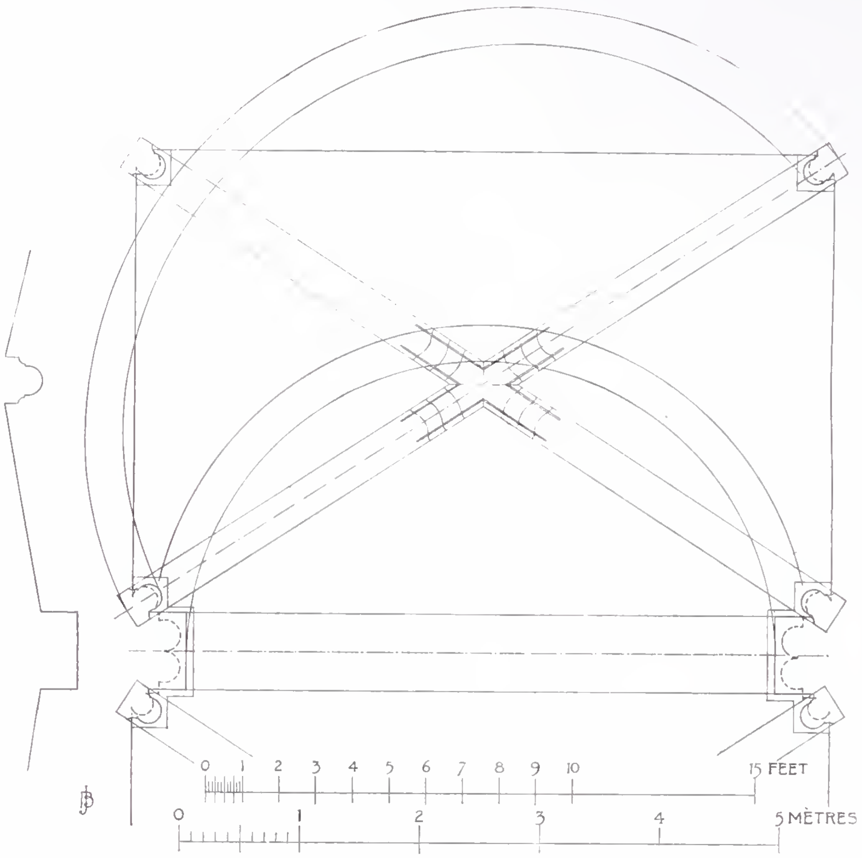

FIG. 22.—ST. JOHN'S CHURCH, DEVIZES, CHANCEL. PLAN OF VAULT.

The difficulties which confronted the builders of these early ribbed vaults, so long as they employed only semicircular or semi-elliptical curves for the ribs, were entirely surmounted by the adoption of the pointed arch for the arcade arches and transverse ribs, for it then became possible to make the diagonal ribs semicircular without raising their keys to any considerable extent above those of the transverse ribs. The nave aisles of Malmesbury abbey church have been frequently quoted as the earliest example in England of this new method of construction,‡ and have been attributed to bishop Roger of Salisbury. Although the excellent character of the masonry strikingly illustrates William of Malmesbury's description of bishop Roger's work, it is scarcely probable that the rebuilding of the church was commenced before the bishop's death in 1139; it must, however, have closely followed that event, and the existing nave cannot be assigned to a later date than the middle of the twelfth century.* The aisle vaults (fig. 23) are supported on the one side by the great cylindrical piers of the main arcades, and on the other by triple shafts on the aisle wall. The arches of the main arcades and the transverse arches of the aisle vaults are all pointed,† the latter being of square unmoulded section. The diagonal ribs are semicircular, and their section shows three large

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* The vaults of the Caen group exhibit various experiments in the curves of their ribs (stilted semicircles, segments of circles, and semi-ellipses).

† The central tower of St. John's, Devizes, affords an early example of the adoption of the pointed arch apart from any connection with vaulting. The tower is much wider from north to south than from east to west; the east and west arches of the crossing are semicircular, while the narrower north and south arches are pointed.

‡ For plan of Malmesbury see *The Builder*, lxviii. 164. The nave is illustrated in detail in *Vetusta Monumenta*, v., plates 1–9.

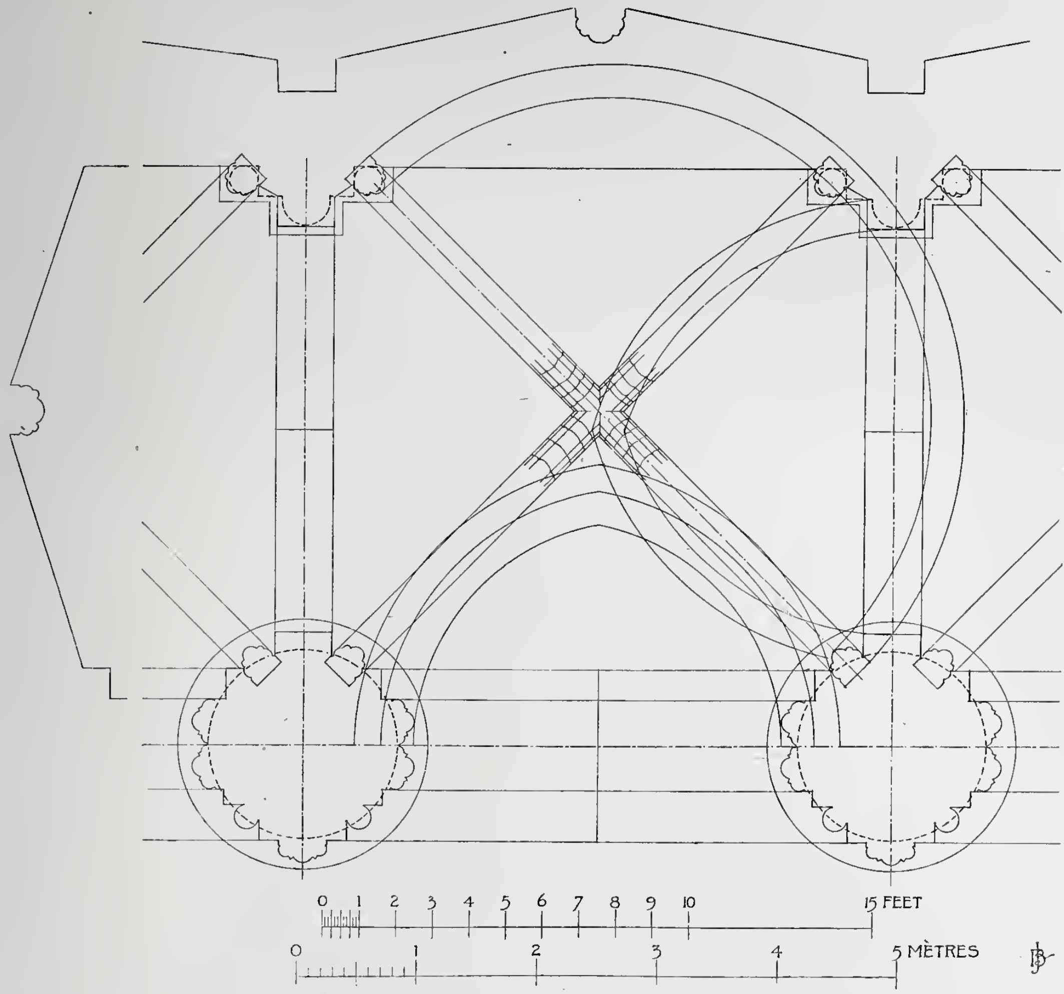

FIG. 23.—MALMESBURY, SOUTH AISLE OF NAVE. PLAN OF VAULT.

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* The passage which refers to bishop Roger's works reads thus:—"Pontifex magnanimus, et nullis unquam parcens sumptibus, dum quæ facienda proponeret, ædificia præsertim, consummaret: quod cum alias, tum maxime in Salesberia et Malmesberia est videre. Fecit enim ibi ædificia spatio diffusa, numero pecuniarum sumptuosa, specie formosissima; ita juste composito ordine lapidum, ut junctura perstringat intuitum, et totam maceriam unum mentiatur esse saxum. Ecclesiam Salesberiensem et novam fecit et ornamentis excoluit, ut nulli in Anglia cedat, sed multas præcedat; ipseque non falso possit dicere Deo, 'Domine dilexi decorem domus tuæ.'" *Willelmi Malmesbiriensis Monachi De Gestis Regum Anglorum*, lib. v. § 408; Rolls Series, ed. Wm. Stubbs, ii. 484. (See also *Historia Novella*, lib. ii. § 481, p. 558, in same vol.) The words 'et Malmesberia' in the passage quoted above are omitted in several of the texts, and if they are authentic they probably refer to the castle which bishop Roger built at Malmesbury, rather than to the church. William of Malmesbury, in his *Historia Novella* (which ends in 1142), makes no mention of any building work in the church, although he relates how the monastery regained its independence in 1140. It is probable that the rebuilding of the church was undertaken very soon after this event.

† It should be noted that at Malmesbury the pointed arch is only used in connection with the aisle vaults; the semicircular form is still retained for all other arches.

rolls with two smaller rolls between them. The keys of the diagonal ribs are placed higher than those of the arcade arches and transverse ribs; in the bay illustrated the surface of the vault cells at the key of the diagonal rib is 1 foot 5 inches above the surface at the apex of the transverse arches, and 2 feet above the surface at the apex of the arcade arches and the apex of the vault on the aisle wall. Mr. C. H. Moore[*] says that this vaulting is an imitation of French work, but this is mere assertion, and there is no evidence whatever to support it, unless we are to assume that the pointed arch necessarily came to England from the Ile-de-France.[†] The raising of the keys of the diagonal ribs above those of the transverse ribs, which he seems to consider a specially French characteristic, is found in many earlier ribbed vaults in England, and is sufficiently marked in the earliest of them all—those of the choir aisles of Durham.[‡] In point of style Malmesbury is purely Anglo-Norman, and shows no trace whatever of the influence of such French work as the chapel of Bellefontaine and Saint-Denis. At the same time these aisle vaults at Malmesbury bring us to the threshold of the complete Gothic vaulting-system, and almost to the time when French influence does undoubtedly begin to affect English work to some extent. We may now leave this part of our subject and turn to a consideration of the vaults over the principal spans of churches.

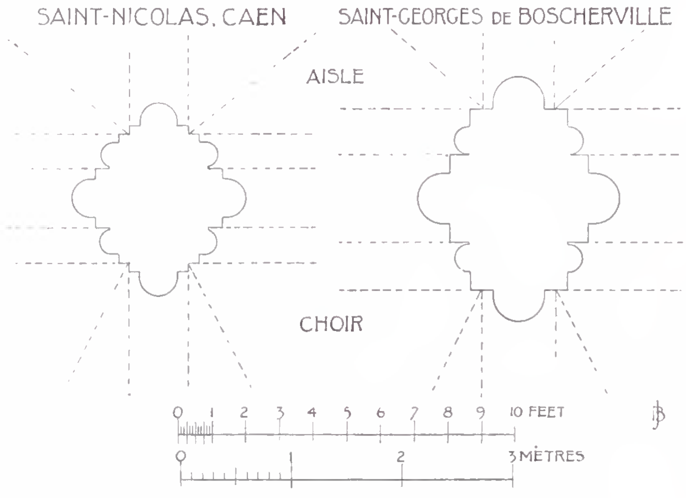

FIG. 24.—PLANS OF CHOIR PIERS.

I have already said that the Normans aimed at nothing less than covering all parts of their churches with stone vaults. That the vaulting of the principal spans was intended to follow the vaulting of the aisles is sufficiently indicated by the plans of the piers. The choir piers of Saint-Nicolas, Caen, and Saint-Georges-de-Boscherville (fig. 24) may be taken as typical examples.[§] Each shows a group of three shafts on each side of the pier to carry the arch-orders of the main arcades, a single shaft which receives the transverse arch of the unribbed aisle vault, and a corresponding shaft towards the main span. Bearing in mind the strictly logical relation between arches and vaults and their supports which is so characteristic of the Normans, the shaft which is generally found on the side of the pier next the principal span can have no other motive than to support a vault.[‖] There can be no question about this in the two examples quoted,

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[*] *Development and Character of Gothic Architecture*, by C. H. Moore (1890), pp. 124–127. Mr. Moore apparently accepts the date usually attributed to Malmesbury, as he speaks of it as a building nearly contemporaneous with Saint-Denis. He makes the surprising statement that Malmesbury is an isolated example, and that nothing in the island leads up to it—an error which, I venture to think, I have already sufficiently corrected. His drawing of the aisle vault (fig. 68, p. 124) is not correct in some details, and the diagonal ribs are not so shallow as he represents. Mr. Moore instances the nave aisles of Fountains abbey as a typical example of English vaulting of the middle of the twelfth century; as a matter of fact the system (pointed barrel vaults on transverse arches) is not English at all, but a Cistercian importation from Burgundy (*cf.* Fontenay in Viollet-le-Duc, *Dictionnaire*, i. 179, fig. 14).

[†] The pointed arch appears in the nave vault of Durham, which (as we shall see) is an exactly dated example, earlier than the date here attributed to Malmesbury. The treatment of the pointed arch at Malmesbury is, however, much more systematic than at Durham.

[‡] In the choir aisles of Durham the vault surface rises from the crowns of the transverse arches to the diagonal keys at almost exactly the same slope as at Malmesbury, though in the latter the slope from the arcades and aisle walls is steeper.

[§] *Cf.* Lessay nave, fig. 20.

[‖] The shaft next the principal span does not exist in such early examples as the Basse-Œuvre, Beauvais, or the for the original unribbed vault remains over each of these choirs, and other examples have survived in Normandy in the choirs of Notre-Dame-sur-l'Eau, Domfront, and Sainte-Trinité, Caen.* It is quite true that in the majority of English examples this shaft does not actually receive a vault, but is merely carried up to the top of the wall, and sometimes finishes under the wood ceiling in a very inconsequential fashion. Nevertheless the motive of this shaft certainly cannot have been the support of a mere tie-beam, as is frequently asserted; it can only be explained by crediting the builders with the intention to vault the main span, though in most cases apparently they did not venture to carry out this intention. The half-barrel vault which still exists over the choir triforium of Gloucester Cathedral† must have been designed to afford the necessary abutment to a vault over the choir itself, though we have now no means of knowing whether such a vault was actually constructed. Surviving examples show that the choir was frequently vaulted, while the nave and transept were covered with wood ceilings, and unfortunately the choir is the part which has most generally been remodelled at a later date. It is not improbable that the failure which naturally attended the construction of the earliest vaults over wide spans may in some cases have rendered subsequent reconstruction a necessity. Whether it is due to this reason, or to the fact that the tradition of a wood ceiling was always strong in England, it is certainly true that very few early examples of vaults over wide spans have survived. Those which do remain are all the more valuable, and it is not unlikely that more careful investigation may add to our present knowledge in this respect.

The earliest instance in England of a ribbed vault over the principal span of a great church, of which sufficient evidence has survived, is (so far as I know) the choir vault of Durham Cathedral, though here the original vault was replaced by the existing vault in the thirteenth century. The vault over the north transept of Durham is probably the earliest of such vaults still existing. The evidence of the structure itself, the analogy of the other vaults of this remarkable church, and the documentary evidence, taken together, enable us to speak with some approach to certainty of the character and date of the original choir vault of Durham. I have already stated that the choir was so far completed in 1104 as to permit the translation of the body of St. Cuthbert to the shrine at the east end. William of Malmesbury relates a wonderful story in connection with this translation—how St. Cuthbert himself in the night removed the centering which supported the vault above the shrine‡—which indicates that the vault over at least the eastern part of the choir had then been constructed—probably the whole choir vault, as there is little doubt that the whole work was of one date. Indulgences of the second quarter of the thirteenth century prove that this vault was then threatening ruin—one of them expressly describes it as a *stone* vault§—and it was subsequently taken down and replaced by the existing vault.

The plan of the choir of Durham (excluding the destroyed apse which formed its eastern termination) consists of two double bays, a type of plan which, at a later date, we are accus-

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nave of Bernay, where a wood ceiling only was contemplated. Nor is it to be found in the following churches in the Soissonnais illustrated in M. Lefèvre-Pontalis' work, and attributed by him to the end of the eleventh century: Berneuil-sur-Aisne, Montlevon, Jouaignes, Oulchy-le-Château, and Saint-Léger-aux-Bois. Indications of such a shaft remain in the nave of Morienval (middle of the eleventh century), and M. Lefèvre-Pontalis suggests that this perhaps indicates an intention to cover the nave with a vault which they did not venture to construct (*op. cit.* i. 196).

[*] The choir of Saint-Georges-de-Boscherville is probably of the early years of the twelfth century, and the other three examples probably date within the eleventh century. Ruprich-Robert assigns Notre-Dame-sur-l'Eau, Domfront, to *c.* 1050.

[†] *Cf.* the half-barrel vault over the nave triforium of Saint-Etienne, Caen. The springing of a similar vault still exists in the choir triforium of Cerisy-la-Forêt.

[‡] "Materia lignorum, quæ recentem presbyterii testudinem sustinebat." *De Gestis Pontificum;* lib. iii. § 135; Rolls Series, ed. Hamilton, p. 276.

[§] "Ubi supra sacrum illius sepulchrum devocio veterum lapideas erexit testudines, quæ jam nunc plenæ fissuris et ruinis dissolutionem sui indicant imminere." Indulgence of Hugh of Northwold, bishop of Ely, dated 1235; Durham Treasury, Misc. Chart. No. 1512 (printed in Raine's *Saint Cuthbert*, appendix, p. 7; see also pp. 101–3 for other indulgences).

tomed to associate with a sexpartite vault. There can, however, be no question of a sexpartite vault here, for the date is much too early for this kind of vaulting. It is worth notice, too, that the double bay does not form a square, but a pronounced oblong, the length of the double bay being much greater than the width of the choir itself.* Had there been any question of covering the double bay with a single quadripartite or sexpartite vault, the oblong plan of the bay would have involved the very difficulty which the double bay of square plan was designed to avoid. On the face of the broad major piers, triple shafts rise from the floor to the springing of the vault, and originally received a broad transverse arch, as in the transepts. The minor piers are cylindrical, with triple attached shafts at the back to receive the ribs of the aisle vaults. The wall-face of the triforium is set back 11 inches behind the wall-face below, and on this set-off stand the shafts which originally received the ribs of the vault—single shafts next the major piers, and triple shafts in the centre of each bay over the minor piers. Next to the major piers in each case the line of the original vault is distinctly marked by the junction of the original masonry of the clerestory with the masonry added in the thirteenth century when the existing vault was built (at B B and C C, fig. 7). Enough remains to indicate that the junction of the vault with the clerestory wall formed a tall semi-ellipse, as in the transept vaults. There can be no doubt that the original choir vault was a ribbed vault, for we cannot imagine that the builders who had already constructed ribbed vaults over the choir aisles would return to the unribbed vault for covering the main span. We may safely conclude that the choir was originally covered with a double quadripartite vault over each double bay, closely resembling the vault of the north transept, which indeed must have been erected almost immediately afterwards. The triple vaulting shaft in the centre of each bay might point to a minor transverse rib, were it not that no such rib is to be found in any of the other vaults over the main spans. The triple shaft probably received only the two diagonal ribs, and the double shaft which takes its place in the transepts was doubtless adopted as a more logical method of supporting the two ribs. The transverse section of the choir (fig. 8) shows how the vaults were abutted by semicircular arches beneath the triforium roof. The arch behind the vaulting shafts in the middle of the double bay is five feet in width, and springs from a pilaster on each side of the triforium. The back of the major pier is thickened by the addition of a broad pilaster next the triforium, with a second projection on its face to receive the abutting-arch, which is six feet one and a half inches wide (fig. 9). It is important to notice that these pilasters and the abutting-arches which they receive are part of the same work as the triforium itself, and not subsequent additions. The form of the arch is not well adapted to receive the thrust of the vault, and, in spite of the great thickness of the walls, the arches have actually undergone some distortion.

The east sides of the transepts follow the design of the choir almost exactly, except that the bays are much narrower and of irregular width,† and that a double vaulting-shaft is substituted in the triforium for the triple vaulting-shaft in the choir. The abutting-arches over the triforium form part of the original work, and, with the vaulting-shafts, prove that vaulting was contemplated when the eastern walls of both transepts were built. On the west walls of the transepts, however, we find only the triple shafts which receive the great transverse arches, but no shafts in the triforium to receive the ribs of the vault. It is clear that the idea of vaulting the transepts was temporarily abandoned when the west walls were built by the monks (there is reason to believe) between bishop William's death in 1096 and Flambard's accession in 1099. In the south transept, indeed, the clerestory was actually

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* This is the case to some extent in other early plans of this type, *e.g.* the nave of Notre-Dame du Pré, Le Mans.

† This irregularity does not arise from any desire to build picturesquely, as some writers have fancifully suggested. The width of the half-bay next the crossing is determined by the width of the choir aisle, and the three remaining half-bays seem to have been divided equally to the centres of the piers and the centre of the gable wall.

built with a continuous arcade, evidently to receive a wood ceiling, though there is no trace of anything of the kind in the north transept. It is equally clear that the vaulting idea was resumed while the work was still in progress. The simple character of the vault of the north transept (fig. 25), and the absence of the zigzag ornament which is used in the ribs of the nave aisle vaults, indicate that this transept must have been vaulted very soon after the completion of the choir vault in 1104. The double bay next the crossing is covered with a double quadripartite vault, without any intermediate transverse rib. The northern double bay is covered with a single quadripartite vault, an alteration evidently due to the extreme narrowness of the half-bays, and the double vaulting-shaft in the centre of this bay, which thus became superfluous, is simply carried up the wall to the crown of the vault. The section of the diagonal rib shows a large roll between two hollows (as in the aisles). The inner order of the transverse arch is similarly moulded, while the outer orders are square. The transverse arch is semicircular; the diagonal ribs are probably segments of circles (as in the aisle vaults), but on account of the narrowness of the bays, especially of those next the crossing, the curves of the diagonal ribs are not very much lower than semicircles. The vault cells next the clerestory are twisted to a very considerable extent. In the narrow bays next the crossing the line of the vault on the clerestory wall is an extremely tall semi-ellipse. On the west side of the transept the diagonal ribs spring from corbels which have been inserted after the wall was built up to the clerestory string, though the wall of the clerestory itself is probably contemporary with the vault.

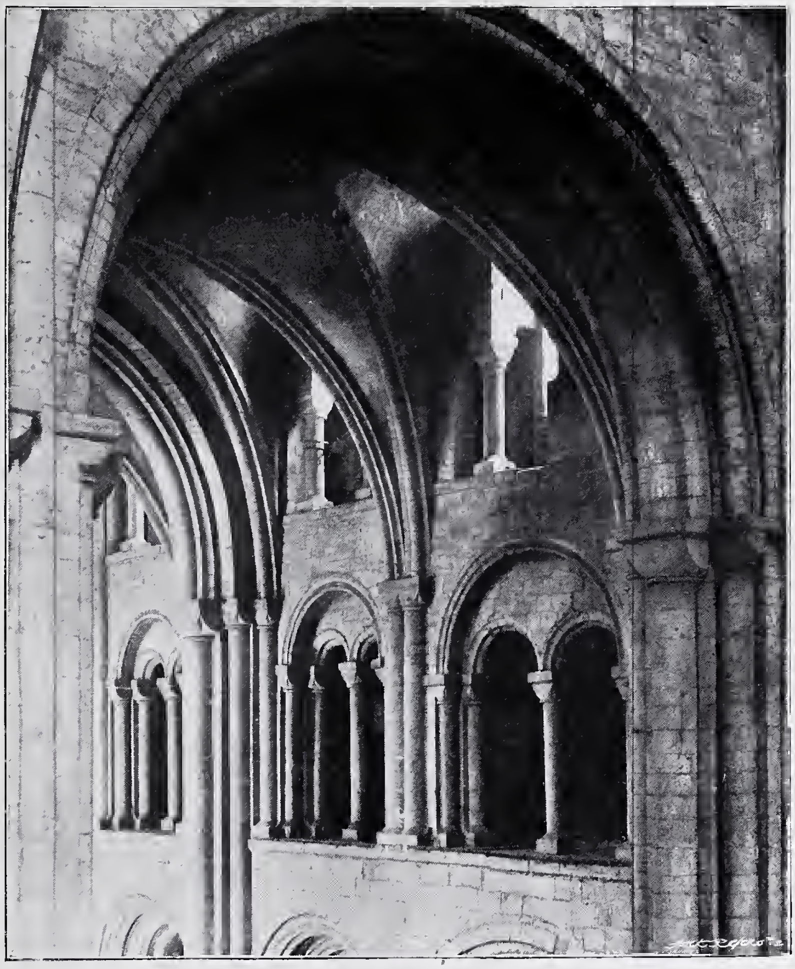

FIG. 25.—DURHAM, VAULT OF NORTH TRANSEPT (EAST SIDE). From a photo. by Mr. C. C. Hodges.

In the vault of the south transept the section of the diagonal rib shows a large roll with zigzags on each side of it. The inner order of the transverse arch has a large roll between two hollows (as in the north transept), but the outer orders are decorated with zigzags. With these exceptions, and the different construction of the clerestory already mentioned, the vault of the south transept presents exactly the same characteristics as that of the north transept. It is evidently a little later in date, though still earlier than the nave vault.

In the nave we meet with the same abandonment of the vaulting idea, and its resumption while the work was still in progress, which characterises the transepts. The vaulting-shafts in the triforium of the choir are omitted in the nave, and the wall-face of the triforium is advanced to the face of the wall below, with an additional shaft supporting an additional order of the outer arch of the triforium openings. Consequently no shafts are provided to receive the diagonal ribs of the vault. There are some indications in the masonry of the clerestory of the two easternmost double bays which favour the idea that the clerestory was originally designed to receive a wood ceiling only. This is probable enough in itself, for we know that, even when the choir of a great church was vaulted, a wood ceiling was still the most usual covering for the nave and transepts. In this case Symeon's continuator expressly tells us that Flambard proceeded with the works *modo intentius modo remissius*, which would tend to render changes of design the more probable. It is quite clear that the triforium was completed up to the clerestory string before any preparation was made for the vault, for the corbels which receive the diagonal ribs have been inserted in the spandrils between the triforium arches. There can be little doubt, however, that the clerestory arcade was designed for, and is practically contemporary with, the actual vault.

The vault of the nave (fig. 26)* shows a very remarkable advance on those of the transepts. The semicircular curve is here employed, not for the transverse arches, as hitherto, but for the diagonal ribs—an advance which Viollet-le-Duc calls the only innovation of the first constructors of Gothic vaults.† The transverse arches thus become pointed, almost as a matter of course, though here the pointed arch is of a somewhat awkward form, owing to its being struck from centres considerably below the springing line. It may be freely admitted that this innovation in the construction of vaults did not at once produce in England the remarkable development which followed its adoption in the Ile-de-France, but this early example is valuable as proving the independence of efforts in the same direction by a school of builders which owed nothing to French influence. The nave, like the transepts, is covered with a double quadripartite vault over each double bay, without any intermediate transverse rib. The surface of the vault at the crown rises from the apex of each transverse rib to the key of the diagonal ribs. The line of the vault on the clerestory wall is a semi-ellipse, and there is no wall-rib. The transverse arches have an inner order moulded with a large roll between two hollows, flanked by an outer order ornamented with zigzags. The lowest voussoir of each outer order is wider than the rest of the arch, which may have been thus reduced in width in order to clear the springing of the diagonal rib more easily. The diagonal ribs have a large roll with zigzags on each side of it. The vault is abutted by half-arches across the triforium beneath the roof,‡ a far more effective method of receiving the thrust than the semicircular arch which is employed in the choir and transepts. These arches, which are five feet in width, spring from chamfered plinths projecting from the outer wall of the triforium; the plinth and the courses immediately above it appear to form part of the original structure, but the arches themselves seem to have been built when the vault was constructed. Similar rudimentary flying buttresses exist in the nave triforium of Sainte-Trinité, Caen.§

The nave vault of Durham has been persistently attributed to the middle of the thirteenth century, apparently on the strength of a vague statement in Leland's *Collectanea*.‖ Billings states that it was constructed between 1233 and 1244, in the Norman style,* which, if true, would be, as he calls it, a perfectly unique fact in the history of ancient architecture. As his error has been repeated by later writers who ought to have known better, it is necessary to assert positively that there is absolutely no authority for the statement. Apart from the fact that mediæval builders were not in the habit of imitating the work of a century before their time, the thirteenth-century vault over the choir shows what the nave vault would have been if it had been erected at the date which Billings assigned to it. The passages from Symeon's continuator already quoted prove that the nave was vaulted between 1128 and 1133. He tells us that Flambard built the nave *usque testudinem*, and that in the interval between Flambard's death (1128) and the accession of Geoffrey Rufus (1133) the nave was completed by the monks. Obviously the vault was all that was required to complete the nave, and the question is finally decided by the character of the masonry of the vault itself. The ribs have the characteristic diagonal tooling, and are built with the usual narrow stones, averaging about six inches in depth. The work presents the same characteristics as the clerestory, and has nothing in common with the works executed in and about the church by bishop Hugh de Puiset and his successors.

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* I am indebted to Mr. C. C. Hodges, of Hexham, for permission to reproduce his photographs of the vaults of the transepts and nave (pp. 259 and 289, and figs. 25 and 26).

† *Dictionnaire*, iv. 35.

‡ Billings' *Durham Cathedral*, pl. xiii. xliii.

§ *L'Architecture normande*, i. 139, 141.

‖ *Durham Cathedral*, by the Rev. W. Greenwell, 5th ed., pp. 37, 38. I am indebted to this excellent work for many references.

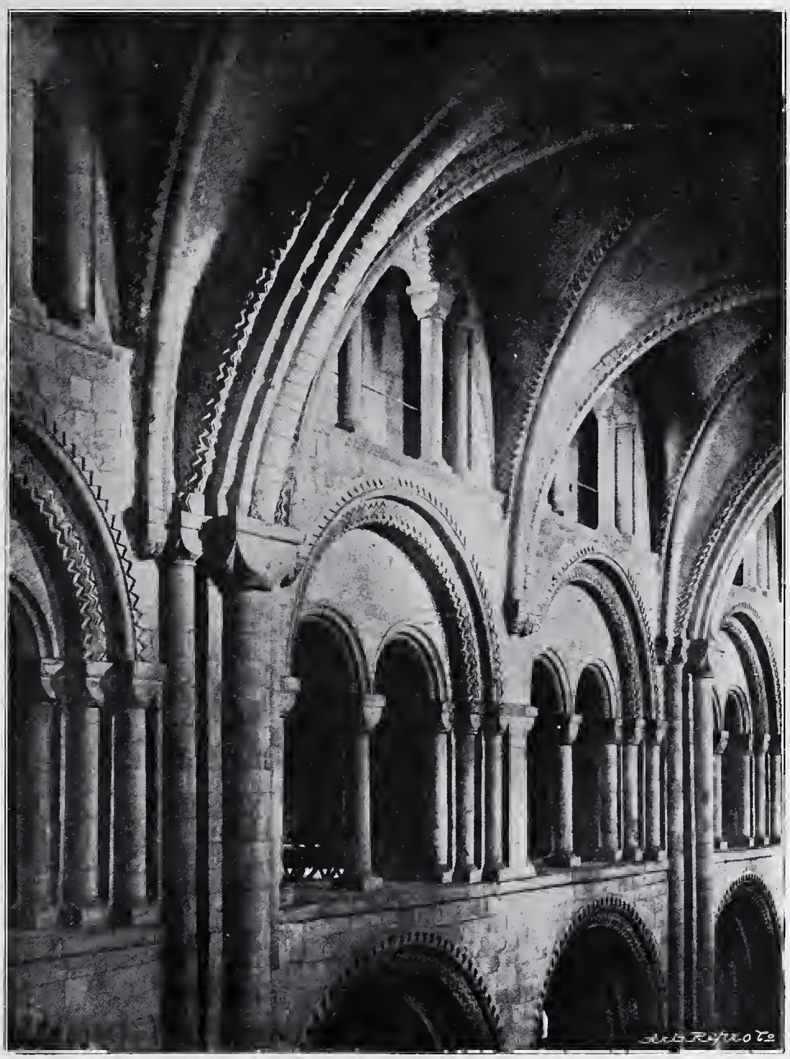

FIG. 26.—DURHAM, NAVE VAULT (NORTH SIDE, THIRD DOUBLE BAY FROM CROSSING).
From a photo. by Mr. C. C. Hodges.

Durham, therefore, affords complete proof of the ability of Norman builders to construct ribbed vaults over the principal spans of a great church, and to abut the thrust of these vaults by arches across the triforium, of which the flying buttress is merely a development. The evidences already quoted indicate that the choir vault was constructed by 1104; the vault of the north transept may be assigned to a date within the first decade of the twelfth century, and that of the south transept within the first quarter of the century; while the nave vault, with its pointed transverse arches, was constructed between 1128 and 1133. The width of the span covered by these vaults is worth remark. The clear width of the transepts between the walls is 33 feet 9 inches (10^{m} 28), and that of the nave 32 feet 4 inches (9^{m} 85). In view of the exclusive claim advanced on behalf of the Ile-de-France for the discovery of the ribbed vault, a remark by M. Lefèvre-Pontalis may be noticed in this connection. He accounts for the fact that the naves of the rural churches of the Soissonnais, even in the second half of the twelfth century, were generally finished with wood ceilings by saying that the adoption of the ribbed vault at this period necessitated a nave of narrow span, and in support of this statement he quotes some of the early vaulted churches in the Beauvaisis,* which are only about as wide as the aisles of Durham.

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* Billings, *op. cit.* p. 16.

In the priory church of Lindisfarne all the main spans were covered with ribbed vaults, which, like the general design of the church, are evidently inspired by Durham. The springings of the vaults of the choir, transepts, and crossing still remain. The choir was covered with quasi-quadripartite vaults, *without* transverse ribs. The diagonal ribs are moulded with a roll between two hollows. Each transept was covered with a single quadripartite vault, with similarly moulded diagonal ribs. The ribs spring from corbels, both in the choir and transepts. The crossing also had a quadripartite vault, the diagonal ribs springing from corbels. One of these ribs is still standing, and has an inner order ornamented with zigzags and a moulded outer order. The vaults have no wall-ribs. Of the nave vault only a ring of stones of the cell abutting on the west wall remains. The work generally seems to be a little later than the nave of Durham, but no part of it appears to be later than the middle of the twelfth century.

Warkworth Church (Northumberland) presents an example on a small scale which is also quite clearly due to Durham influence. The chancel (32 feet by 16 feet 6 inches) of two bays is covered with a ribbed vault, of the quasi-quadripartite form, originally without a transverse rib.† The ribs are received by short shafts which stand on the string which runs below the window-sills, the wall-face above the string being set back behind the wall-face below, exactly as in the triforium of the choir and east side of transepts at Durham. The shafts are single at each corner of the chancel, and double in the centre of the side walls, each shaft receiving a rib. The section of the diagonal ribs shows a large roll with a zigzag on each side of it. The diagonal ribs are segments of circles, struck from centres below the springing line. The setting-out of the vault was evidently governed by the semicircular chancel arch. The cells at the crown rise slightly towards the keys of the diagonal ribs (about 4 inches from the chancel arch, and 9 inches from the side walls). The line of the vault on the side wall is an upright semi-ellipse. The ribs are built of thin stones, averaging about 6½ inches in thickness. There is no wall-rib. The work may be dated approximately at 1120–1130.

Besides Durham the nave of at least one other great cathedral church was vaulted before the middle of the twelfth century. The nave of Lincoln (built by Remigius, and dedicated in 1092) was injured by fire in 1141, and Giraldus Cambrensis tells us that it was vaulted by bishop Alexander.‡ Henry of Huntingdon, who places the date of this work at 1146, says that Alexander made it more beautiful than when newly built, and second to no structure within the bounds of England.§ Only a fragment of the triforium of Remigius' nave remains, in the bay between the western towers, and above is Alexander's clerestory, with the tall semi-elliptical line of the vault.* What this vault was like is fortunately indicated with some approach to certainty by the chancel of Stow church (Lincolnshire), the detail of which so closely resembles Alexander's work at Lincoln as to prove that it was executed by the same school of masons. The chancel of Stow is three bays in length, and 24 feet (7^{m} 32) in width. The bays are divided by triple wall-shafts, one shaft receiving each rib of the vault, and there is also a shaft in each internal angle at the east end to receive the diagonal ribs of the eastern bay. The vault itself is a modern reconstruction from rib stones which were found in the upper parts of the walls; some of the ribs have a roll between two hollows, and others are ornamented with zigzags. The evidence here indicates that the vault which Alexander constructed over the nave of Lincoln must have been a ribbed vault.

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* *Op. cit.* i. 90. The width between the walls of the nave of Cambronne is 12 feet 10 inches (3^{m} 91), and of the nave of Bury 15 feet 9 inches (4^{m} 80). M. Lefèvre-Pontalis says that Cambronne cannot be later than 1125. Of the two rudimentary examples of the ribbed vault which he is inclined to attribute to the end of the eleventh century that of Rhuis, near Verberie, is a single bay of an aisle vault over a square of 2^{m} 20 (7 feet 2 inches), and that of Auviller, near Clermont in the Beauvaisis, is a tower vault with a span of 2^{m} 60 (8 feet 6 inches).

† The existing transverse rib is a later addition. The church will be illustrated and described in the forthcoming volume of the *History of Northumberland.*

‡ "Ecclesiam tamen Lincolniensem casuali igne consumptam egregie reparando lapideis fideliter voltis primus involvit." *Giraldi Cambrensis Vita S. Remigii*, Rolls Series, ed. J. F. Dimock, cap. xxii. (vii. 33).

§ "Ecclesiam vero suam, quæ combustione deturpata fuerat, subtili artificio sic reformavit, ut pulchrior quam in ipsa sui novitate compareret, nec ullius ædificii structuræ intra fines Angliæ cederet." *Henrici Archidiaconi Huntendunensis Historia Anglorum*, Rolls Series, ed. Thos. Arnold, pp. 278–9.

Such examples of ribbed vaults over main spans as the choirs of Kirkstall and St. Cross, where all the transverse arches are pointed, lie outside the limits of this paper. So far as my observation goes, the choir of St. Cross is the earliest English example which indicates that its designer knew anything of contemporary work in the Ile-de-France, although its details are English enough in character. The buildings in England of what is generally called the Transitional period still await analysis from this point of view, which would have to take into account not only undoubted influence from the Ile-de-France itself, but also the powerful effect of the Cistercian revival, which has scarcely been sufficiently recognised in this connection.

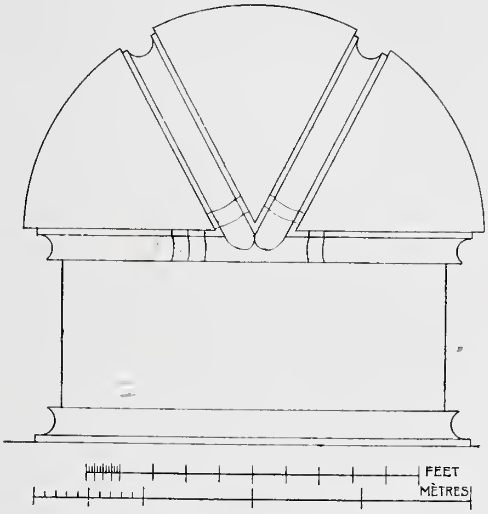

FIG. 27.—CHRISTCHURCH, CHAPEL ON EAST SIDE OF SOUTH TRANSEPT.

A few early examples of ribbed vaults to apses remain to be noticed. That of the small apsidal chapel on the east side of the south transept of Christchurch (Hants) appears to date from early in the twelfth century (fig. 27). The apse is divided into three bays by single wall-shafts on a square pilaster, and the ribs present the same section. The broad semicircular arch which opens into the apse is finished with a similar roll received by angle-shafts. The two ribs radiate to the crown of this roll, the key being one large stone. The ribs are constructed with the usual narrow stones. The apsidal chapel on the east side of the south transept of Tewkesbury abbey church has a vault of similar plan, with two chamfered ribs springing directly from the wall, and radiating to the crown of an unmoulded semicircular transverse arch. This vault may be assigned to the first twenty years of the twelfth century (the church was dedicated in 1123). A later example (middle of twelfth century) of an apse vault of similar plan is to be found in Birkin church (Yorkshire), where the ribs are moulded with triple rolls separated by fillets (fig. 29); the curve of the vault cell is generated by the semicircular window-arch, and the concave cells rise sharply towards the crown, giving the vault a quasi-domical effect. The same characteristic is presented by the octopartite vault of the Treasury of Canterbury Cathedral, although its plan is square, not apsidal.†

The apse vault of the Chapter-house of Durham Cathedral was a larger and more advanced example, and one which, fortunately, is accurately dated. The Chapter-house was finished by bishop Geoffrey Rufus, 1133–1140.* It was partly destroyed in 1796, but Carter's drawings have preserved an accurate record of it.† The apse was divided into five bays (fig. 28); the ribs of the vault sprang from large figure corbels, three of which are preserved in the Chapter Library, and the keystone of the vault still exists. The section of the ribs shows a roll between two rows of zigzags. The key, A, did not actually cover the centre of the apse curve, but the vault was set out by keeping the ribs 1 A 5 and 2 A 6 in straight lines on plan, the ribs being thus of unequal length. The width of the Chapter-house within the walls is 34 feet 6 inches (10^{m} 52).

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* *Archæological Journal*, xl. 192, pl. ii. (A).

† Willis's *Monastery of Christ Church in Canterbury*, fig. 6 and p. 77. The treasury was probably built soon after 1130.

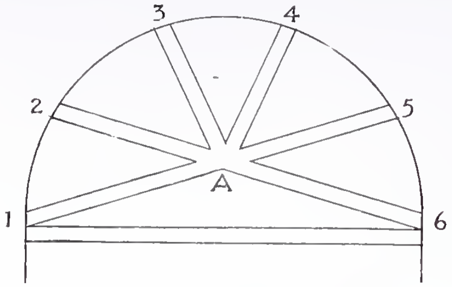

FIG. 28.—DURHAM, APSE OF CHAPTER-HOUSE.

It is only necessary to add a few words as to the bearing of the English evidence on the general question discussed in the first part of this paper. We have seen that, before the introduction of the rib, the Normans were already developing the articulation of their construction to an extent which (to judge from the early examples illustrated in M. Lefèvre-Pontalis' work) was quite unknown in the Ile-de-France. The earliest ribbed vaults described above, in which the diagonal rib follows a segmental curve, exhibit a system which is slightly less advanced than even the primitive vaults over the aisles of Saint-Etienne, Beauvais, in which the transverse arches are stilted considerably, so as to admit of the diagonal rib being made semicircular, or nearly so. The large number of ribbed vaults still remaining proves the existence of an active school, which had already accomplished much before the introduction of the pointed arch. It is remarkable that all these English vaults are quadripartite. We have met with no example, either of the sexpartite vault‡ or of the intermediate form—a quadripartite vault over a double bay divided by a secondary transverse rib carrying a wall—both of which occur in Normandy itself, in the group of churches in and around Caen. Obviously the quadripartite vault was the earliest form, and (as Herr Dehio says) the other varieties could not have been developed if the quadripartite vault had not previously been known. The evidence of the rib sections points in the same direction. As in their system so also in the profiles of the rib mouldings, the earlier ribbed vaults in England which have been described above come into line with the quadripartite vaults at Lessay, and represent an earlier stage than the vaults of the Caen group. These latter, whether sexpartite or of the

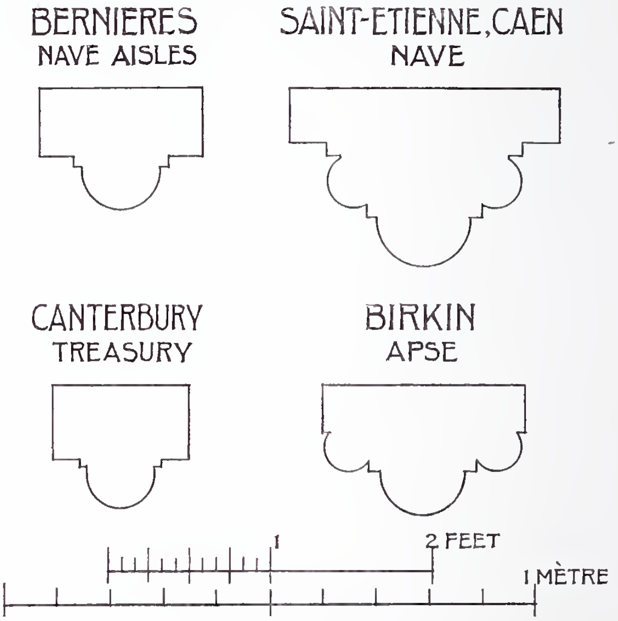

FIG. 29.—SECTIONS OF RIBS.

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* "Ipsius (Gaufridi) tempore capitulum monachorum consummatum est." Symeon, *Continuatio*, Rolls Series, ed. T. Arnold, i. 142.

† John Carter's drawings were published by the Society of Antiquaries in 1801. An interior view of the Chapter-house is given in Billings' *Durham Cathedral*, pl. lii.

‡ I know of no sexpartite vault in England which is earlier than the work of William of Sens at Canterbury.

intermediate form (quadripartite cut by a secondary transverse rib), show one easily recognised type of rib section (fig. 29), a more refined and clearly later type, which we do not find in England until we come to the octopartite vault over the Treasury at Canterbury Cathedral, probably erected soon after 1130.* In the absence of any definite evidence, the approximate date of 1130 which has been suggested † for the earliest vaults of the Caen group, seems probable enough, and the experiments which the builders of these vaults tried in setting out the curves of the ribs indicate that they were not adopting ready-made a system already worked out elsewhere.

Even, however, if the English evidence alone is considered, the authenticated dates of the earliest ribbed vaults prove that influence from the Ile-de-France is quite impossible. They enable us to assert positively the complete independence of the Norman school, up to the end of the first third of the twelfth century at any rate. The question, How far were the beginnings of the French transition influenced by the neighbouring province of Normandy ? is more difficult of solution. On *prima facie* grounds the influence would appear to have been much more considerable than most French archæologists have hitherto been willing to admit. It is the hope of contributing something towards a definite conclusion on this question which has induced me to attempt a systematic presentation of the English evidence.

DISCUSSION OF MR. BILSON'S PAPER.

Professor Aitchison, R.A., *President*, in the Chair.

Mr. R. PHENÈ SPIERS [*F.*], in proposing a vote of thanks to the author of the Paper, said that the principle which Mr. Bilson desired to set forth, if he understood him rightly, was to prove that the Norman vaulting in England was of an independent character, and was not necessarily copied or imitated from any examples in Normandy, but that, on the contrary, it was a probable development of some features a few years earlier than examples we were acquainted with in Normandy. Mr. Bilson had stated that the revival of architecture in Normandy seemed to have been commenced under Duke Richard II. The revival of architecture all through Europe commenced in the early years of the eleventh century, and so far as his own acquaintance with buildings in Normandy was concerned, if anything they were more behindhand than in any other part of France. The chief authority on this subject, M. Ruprich-Robert, had published a work on Normandy which they had in their library. It did not seem, however, that he was altogether sanguine as to some of the early dates given for Norman architecture. Among the illustrations of the early churches, the earliest at Querqueville was a triapsidal church with a square centre covered by a tower (showing that in the north of France, at all events, they had not adopted the dome which was found in the south), with three apses, one on the east side, one on the north, and one on the south. The masonry in the church was of a very primitive character, of small stones sometimes in zigzag courses, which distinguished work up to the end of the tenth century, and so far as he knew there was no other example in Normandy in which the same character was found. There was a second church of exactly similar plan—the small church of St. Saturnin, near St. Wandrille. He had not seen the church, but had examined photographs of it very carefully. There was no doubt that the work was of a much later date, although on the same plan. There was no small masonry. From the character of the moulding he thought that at the very earliest it might be 1030. Then there was the church at Bernay, which may have been built by Richard II., though it is said to have been commenced after his death. Ruprich-Robert published a bay of the nave, which he attributed to two periods, the inner shafts, capitals, and vaulting being of a later date. An illustration of the same was also given in De Caumont, and he attributed it to about 1050. The character of the carving in the capitals and the groining of the vault distinctly showed a later date, probably about 1050, and it seemed to indicate the influence of a different school of Burgundian origin. Mr. Bilson had arrived at the same conclusion. If that date be correct, it showed they were not very far advanced in that period in their architectural development, and it was not until one came to the work of William the Conqueror, ten or twelve years later, that the immensely rapid advance in which all the features were articulated and carried on separate shafts or piers, was found. In an important Paper read before the Institute in 1863,* the author, Mr. John Henry Parker, having made an accurate examination, arrived at the conclusion that the whole of the vaulting of the nave of the great church of St. Stephen at Caen (L'Abbaye aux Hommes) was long subsequent to the erection of the structure. He found traces of the original shafts which rose to carry the tie-beams. The conclusion arrived at by Mr. Parker was that this vaulting was not completed until about 1150, *i.e.* from twenty to forty years later than the date Mr. Bilson had given for the earlier vaults at Durham. Therefore one would be glad to know of the earlier vaulting, such as Lessay, which he had shown as an early example of vaults in France. In conclusion, Mr. Spiers said he had been especially struck with the great beauty of the photographs Mr. Bilson had put before the meeting, and the admirable way they illustrated his remarks. He was glad to have the privilege of proposing a very hearty vote of thanks to Mr. Bilson for his admirable paper, and the care and research he had given to the subject.

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* The profile from Saint-Etienne, Caen, illustrated here is found also in the arches of the nave arcade of New Shoreham church, which Mr. Edmund Sharpe assigned to *c.* 1130 (*The Architectural History of St. Mary's Church, New Shoreham*, by Edmund Sharpe, 1861 ; supplemental sketch, p. 6).

† See note ††, p. 265 *ante*.

Mr. FRANCIS BOND, M.A. [*H.A.*], said he was very glad to have the privilege of seconding the vote of thanks to Mr. Bilson. All must recognise the enormous amount of care and labour that had been spent on the Paper. He happened personally to know that it represented many months of work. When it appeared in the Journal with the illustrations and drawings, it would represent one of the most valuable contributions which had been made to the Institute Transactions for very many years. It was a paper of exceptional importance. If what Mr. Bilson contended was correct as to the chronology of the choir-vault of Durham Cathedral, then they must come to the conclusion that the greatest work in mediæval architecture in Western Christendom was Durham Cathedral, and that its architect was a man they must put on a higher pedestal than the architect of Saint-Denis, or Vezelay, or of any other of the great churches where Gothic architecture had been supposed to originate. He himself should be glad to accept that view; but there seemed to be some difficulties in the way, which perhaps the author of the Paper might remove. In the first place, there was the old conflict between architectural and documentary evidence. Upon that he had the honour of speaking before the Institute at some length not long ago. He thought that the whole case with regard to Durham rested on a few words of a mediæval chronicler; especially on the words that the nave was finished *ad sui usque testudinem* in the year 1128. One was scarcely justified, however, in assuming that the translation given to those words *ad sui usque testudinem* was necessarily the right one. They were always translated as if they meant that Durham Cathedral was finished up to the *vault* in the year 1128. But in mediæval builders' Latin *testudo* also applied to wooden roofs. In Mr. Bilson's own paper, in one of the notes, the phrase *lapideas testudines* occurred, with regard to the vault that fell at Durham in the thirteenth century. It seemed to show that the word properly applied to a ceiling either of stone or wood. Therefore, so far from it being necessary to believe that the *testudo* in Durham in 1128 was a stone vault, one was quite at liberty to suppose that it was a wooden ceiling of some sort. In the second place, he found it difficult to believe that in the year 1104 the high roof of Durham choir was one of stone. It would be a very remarkable thing indeed. Looking back at the vaults that had been constructed up to that date, it would be found that no such vault had been constructed anywhere up to 1104. Nothing like it had ever been put up. The points about it were: first of all, that it was a ribbed vault high up in the air, and a vault over a nave which had low aisles on each side—which added greatly to the difficulties of construction; that it was a vault that had clerestory windows inserted below it; and also that it was a vault divided into oblong compartments, which to mediæval architects were much more difficult to build than square ones. They bungled dreadfully over oblongs, and shirked them in all sorts of ways. There was not a single vault he could think of that triumphed over all these difficulties so early as the year 1104. The earliest main nave that was vaulted he supposed would probably be in one of the churches in Lombardy; perhaps the existing vault of the church of S. Ambrogio, Milan. This was supposed to have been put up between the years 1050 and 1100, which was anterior to the date given to Durham Cathedral. But that vault was much simpler and much more archaic. The ribs were heavy, clumsy, square ribs without mouldings; and the nave was divided, not into oblongs, but into squares. Moreover, in order to put up the Milan vault, the architect had to omit the clerestory; he wanted to keep the nave as low as possible, to make his work easy. And he constructed the aisles two stories high. So that by lowering the nave and raising the aisles he met the difficulty of abutment. Therefore this vault was not by any means of such an advanced character as the one at Durham of 1104. The next step made, perhaps, was the vaulting of the great Cluniac churches, *e.g.* Paray-le-Monial, and also the church of Saint-Etienne, Nevers. In those they had a high vault, and a clerestory underneath the vault. But the high vault over the nave in these Cluniac churches was generally a semicircular barrel—a much more archaic affair.

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* "On the Abbey Churches at Caen," R.I.B.A. Transactions 1863, p. 99.

The next step was seen at Vezelay. That also was a Cluniac church, but different from the other churches of the Order in having an intersecting high vault, like Saint-Nicolas, Caen; both are inferior to Durham in that the intersecting vault was merely a groined vault, and not a ribbed vault. These two Cluniac churches, Paray and Vezelay, were both dedicated in 1104. The vault of Vezelay was probably later than Durham choir in date, but was far less advanced in style. These seemed to him to be very important examples. They were churches the most advanced in style of their day. Durham choir, if it was of the date of 1104, was the first complete solution of the great mediæval problem how to vault completely the whole of the spans of a church constructed on a basilican ground-plan, and with top-lighting, *i.e.* with clerestory windows. Thirdly, if the Durham architect had solved that great problem as early as 1104, one would imagine that all the mediæval builders in England would at once have set to work to copy this vault. There the problem was solved; and one ought to be able to find in England especially, and also in France and Germany, any number of vaults constructed on the lines of Durham. But one did not find them. Mr. Bilson had given the instances of Lindisfarne and of Warkworth. Those churches were neighbours and appanages of Durham Cathedral; their chronology was uncertain, and he imagined stood or fell with that of Durham. The vaults in existence at Lindisfarne were over the transepts and chancel; at Warkworth over the chancel. Those two chancels and the transept were unaisled, and therefore not so advanced in character as Durham. The next example given was that of Lincoln nave. But that was gone; and one did not know what it was like. That could not be taken as evidence. It might have been a vault arranged in squares, and not in oblongs at all; it might have been half a dozen things. There was no evidence to show that it was so advanced in type as the vault of Durham choir. Passing on to such a vault as that of Kirkstall, Mr. Bilson said that it was possible that that vault was built in 1159, or earlier still. It was more likely to have been built after the year 1159; in any case they were getting a long way off from 1100. But even there the vault was not so difficult a matter as at Durham, because at Kirkstall the choir had no aisles. He did not know where to find any vault so advanced as this assumed choir-vault at Durham. Had they to go to Canterbury choir, vaulted about 1180, or to the Priory Church of Boxgrove or Chichester Presbytery, vaulted in the very last years of the twelfth century, before they found anything so advanced as at Durham? These difficulties seemed to be of considerable importance, and he should be glad if Mr. Bilson could prove that in spite of them one was right in claiming that the great problem was solved at Durham. As it stood, there was nothing leading up to Durham. It was far more advanced than anything that had preceded it, although Norman architecture had only come into England some thirty years before. It was copied by no one for some forty years or more, and then only at Lindisfarne. Therefore, *à priori*, that is exactly the reverse of what one would have expected, as it seemed to him.

Mr. W. H. St. JOHN HOPE, M.A., said he should like to ask Mr. Bilson whether he had considered the case of Norwich. Norwich was a great church of the Norman period that was complete in all its parts, so far as the plan went, and the history of it was perfectly well known. It was true that the main spans were not vaulted until late in the fifteenth century, but we do not know that the presbytery was not vaulted from the first, because whatever roof it had was crushed in by the fall of the steeple in the fourteenth century, and again rebuilt by Bishop Goldwell. Norwich was begun by Bishop Herbert in 1096, and at his death, which occurred in 1119, he is said to have completed the church as far as the altar of the Holy Cross. So far as his (Mr. Hope's) knowledge of the church and its arrangements went, the altar of the Holy Cross would be situated about four or five bays down the nave: so that the bishop must have completed the whole of the eastern arm, the transepts, and the eastern portion of the nave. The work was carried on by his successor, Everard, who held the see from 1121 to 1145, when he resigned. He is said to have completely finished it. From the architectural evidence of the church it is clear that it was intended to be vaulted from end to end. The aisles throughout the church possess the vaults that were put upon them by their builders. They have the transverse arch and the unribbed groins, and they also have what does not occur even in Durham, a wall-rib, which is essentially a development of the earlier examples cited by Mr. Bilson. With regard to the central parts, the church is divided, so far as the presbytery and nave are concerned, into double bays like Durham. There are fourteen bays in all in the nave, which makes seven double bays, and in the presbytery there are two double bays with an apse beyond. The principal piers have on the nave side a very prominent vaulting shaft starting from the floor, consisting of two half-round shafts flanked by a nook shaft on each side. The intermediate piers have only a single half-round shaft, which also starts from the floor and runs up to the springing of the triforium arcade, where it ends in a capital of rather peculiar form. These features lead one inevitably to the conclusion that the main shafts in front of the principal piers were to carry a transverse arch, as at Durham. The nook shafts attached on either side were meant to carry ribs which would cross over to the shafts standing on the broad capitals at the springing line of the triforium arches. In fact, we should get exactly the same arrangement as the Durham one, only probably of a plainer character. It is very unfortunate that disasters which befell the church at Norwich prevented this vault ever being completed so far as the nave and transepts were concerned. The transepts were evidently intended to be vaulted also, because the four bays of which they are composed are divided by broad semicircular shafts which run up in the same way as those in the nave, and were obviously intended to carry a vault somewhat of the same character as that of Durham. This evidence of vaults over the main spans is also corroborated by the evidence of the abutments. In the triforium all round the church, at the back of each of the piers, there occurs a tall shaft running right up almost to the level of the clerestory wall passage, and on the opposite wall there is a shaft of only half the height, showing that it was the intention of the builders to throw across a half arch, like those in the nave at Durham. So far as he (Mr. St. John Hope) knew, there was no proof all round the church of these abutments having been completed; certainly there was not one remaining. But there was all this architectural evidence, which, so far as he was aware, had not been noticed by anybody who had written upon the church. The very fragmentary paper Professor Willis left behind him did not refer to the fact in any way, although he gave a section of the presbytery which had upon it all the evidence which he had just described, including the half arch which was afterwards built to take the thrust of the later vault. These responds to carry the flying buttresses remained to this day all round the presbytery and down the south side of the nave, and in part along the north aisle, but on the outer wall of the north aisle they had been cut away and the scars plastered over. In any history of vaulting, this particular church, he thought, ought to be taken into consideration, although at the present day it exhibits a much more highly developed system.

Mr. E. W. HUDSON [*A.*], on the question of the locality where the great development in vaulting had its rise, thought it most likely that the schools of Europe reflected and re-reflected one upon the other, and gave rise to these changes in the system. Among the vast number of persons following the Crusaders across Europe there must have been some architects, who observed and noted, not only in France but in Normandy and Italy, the various devices adopted in the development of architectural work and, *inter alia*, its special vaulting characteristics. As a student he had endeavoured to follow Mr. Bilson's erudite descriptions and deductions, but it would take years to thoroughly investigate and follow out his observations. In going so far afield in one's researches one was apt to overlook the examples close at hand. As regards the diagonal rib, in the City of London and at Westminster there were examples of vaulting which led the student very well from point to point. Some of these Mr. Bilson had referred to. One instance, however, he (Mr. Hudson) wished to draw attention to was not so well known as it deserved to be. In the crypt of the Priory of St. John's, Clerkenwell, there was a very fine example of the early ribbed vault which he should feel inclined to put some twenty-five years earlier than Rahere's unribbed work at St. Bartholomew's of 1123. That vault was worthy of close study. There were three bays of early date and two bays of transitional work. The early bays might be put at 1095, and, if that were the case, those ribs would show that we had in London a ribbed vault twenty-five years earlier than Rahere's work. The cross ribs were unusually large. They were made up of ashlar voussoirs on each angle with rubble between, and the plaster with which the web was covered was brought down over the cross ribs and finished in scollops. On the stone which was left bare there were even now traces of colour. On the diagonal ribs the plaster was brought down in a similar manner, and there finished with zigzags on the edges. One noteworthy peculiarity was that, although the cross joints of the keys were rectangular, in the other which abutted against it they were askew, differing from that illustrated by Mr. Bilson, which was more of a lozenge shape. The ribs sprang from a rectangular pilaster, and there was a thick abacus very similar to that upon the large crypt capitals of columns at Gloucester. The shaft was only two feet in height. If he were correct in the date he put upon this example there was a link in the chain of evidence which led students on fairly well until they came to the more advanced thirteenth-century work at Westminster.

Mr. JOHN BILSON [*F.*], after acknowledging the vote of thanks, said that Mr. Spiers was quite mistaken in thinking that he wished to claim for English Norman work any superiority over that of Normandy itself. The Caen group of vaults, in their system, were in advance of the English examples he had illustrated. M. Lefèvre-Pontalis assigned them to *c.* 1160, but M. Régnier thought 1130 a probable date. Herr Dehio had shown that the sexpartite and intermediate form found in that group could not have been developed unless the quadripartite vault had already been known. The English evidence clearly illustrated this earlier phase, represented in Normandy by the vaults at Lessay and other early examples; the authenticated dates of some of the English examples proved the impossibility of influence from the Ile-de-France suggested by M. Lefèvre-Pontalis, and confirmed Herr Dehio's opinions as to the position of the Norman school. With regard to Mr. Bond's remark that his (the speaker's) conclusions would attribute to a Durham architect the earliest solution of the problem of constructing a stone vault in oblong bays over a three-aisled church with clerestory, that was surely an over-statement of the case. To take only one example from Normandy, that problem was solved with unribbed vaults in the choir of Saint-Nicolas, Caen, which dated *c.* 1083, some ten years before Durham was commenced. He was not surprised to find that Mr. Bond had some difficulty in accepting his conclusions as to the high vaults of Durham. When Canon Greenwell first drew his attention to the subject, he felt the same difficulty, but a prolonged study of the building had led him to believe that the conclusions which he had put before them were in the main the only possible deductions from the evidence. It was not a mere question of the interpretation of a single passage. The architectural evidence amply confirmed the dates suggested by the documents. What were the factors to be taken into account? 1. As to the choir vault, they had the undoubted fact that the choir was occupied in 1104; they had William of Malmesbury's story about the centering; the design of the choir pointed to a stone vault in the most unmistakable fashion; there was the evidence of the vault itself on the clerestory walls, and in 1235 the vault, which was then threatening to fall, was described as a stone vault which was built by the men of old, &c. 2. In the north transept they had the actual vault to which the whole design pointed as in the choir, and the character of the detail agreed with that of the earliest work in the church, that of the lower parts of the choir. 3. In the south transept they had similar vaulting, evidently a little later in date, and in character coming into line with Flambard's work in the aisles of the nave. 4. Then came the nave vault, with the pointed arch used tentatively. 5. Then the vaulting of the chapter-house, which, as told by a contemporary chronicler, was finished in the time of Bishop Geoffrey Rufus (1133–1140)—and here it would be found that, although the semicircular transverse arch was still used, the detail of the zigzag showed a decided advance over that in the nave vault. 6. Then there were the high vaults of Lindisfarne, copying the system of the Durham nave, and it was impossible that the completion of that church (except alterations) could be placed later, at furthest, than the middle of the twelfth century. Mr. Bond had suggested in his recent book that the high vaults of Durham might have been built by Hugh Pudsey, *c.* 1160, but there was no evidence whatever to support that suggestion; the vaults showed a gradual advance which must have occupied some years; and their architectural character was utterly unlike Pudsey's works, of which several notable examples remained in the city and bishopric of Durham. He thanked Mr. St. John Hope for calling his attention to the evidence of the piers at Norwich, and he only hoped that his paper might lead to more careful investigations in directions which he had been unable to explore.

The following further contributions to the discussion on Mr. Bilson's Paper have been received:—

From Professor BALDWIN BROWN, M.A. [*H.A.*]—

Mr. Bilson's *résumé* of recent discussions on the origin of the Gothic style is particularly valuable, as bringing into light the extent and the intricacy of the questions at issue. The age of authority—represented, especially in this country, by Viollet-le-Duc—has passed away, and we are confronted by several contending theories advanced by French specialists, each of whom has dwelt on the evidence that accords with his personal theory. A broader and more satisfactory treatment of the whole matter has been supplied by the German authors of the *Kirchliche Baukunst des Abendlandes*; but even this book, indispensable as it is to the modern student, does not cover the whole field, and makes but a partial use of the English evidence which Mr. Bilson, in his second paper, has for the first time rendered fully available.

It is curious how Durham has been neglected by foreign writers. It lies a little to the north, but that ought not to be a real hindrance in the way of the study of a building extolled by Professor Freeman as forming with its adjuncts and surroundings the finest Romanesque monument in Europe, a building too which has a special importance in the history of construction. The fact that in the case of Durham literary sources of information flow pretty freely, makes it all the more instructive. The interpretation put on these notices in the paper may not all be absolutely conclusive, but Mr. Bilson has in each case drawn the most obvious and natural inference from the words, and never forced them into an unlikely, though possible, sense. The most important point of all is the one subject to the least doubt. That the nave vault is twelfth-century work, or, in other words, is as Norman as it looks, must be quite clear to any one who examines the workmanship of it.

The facts about the use of the rib in the groined vaults of the eleventh and twelfth centuries, which are now before the profession, should inspire some one to take up the whole question of the origin and history of this feature. Dehio and von Bezold (vol. i. p. 306) express themselves doubtfully about the reason for its adoption, and this would have to be considered in connection with the undergirding ribs of the Romanesque barrel vaults of the south and west of France, and their earlier employment in the Roman "Bath of Diana," at Nismes.

The facts about the curves of the earliest known diagonal ribs under groined vaults which Mr. Bilson has recorded, have an important bearing upon the relation of the rib to the groin. The diagonal line of the groin is elliptical, but that of the earliest ribs appears to be, as a rule, segmental. Had the ribs originated from the desire either to strengthen the construction at the line of junction of the vaulting fields, or—with a more æsthetic intent—to mark with decision the often irregular and uncertain arris of the groin, it would have been most natural for them to follow the elliptical curve of the actual diagonal. On the other hand, if they had been adopted ready-made, as they existed in barrel-vaulted buildings, the semicircular or segmental form would be, as a matter of course, retained.

A very curious instance of an early use of the diagonal rib occurs at Exeter, about which accurate information would be very desirable. In a vaulted undercroft in the existing fragments of St. Nicholas' Priory, dating from the early days of William Rufus, and of very rude and irregular construction, transverse arches are used throughout as in the undercroft at Westminster, but in the corner bays there are, in each case, single diagonal ribs under one of the two diagonal groins, but not under the other. The springing of these diagonal ribs in relation to that of the transverse ribs shows that they are contemporary with these and not afterthoughts, and the reason and function of them would be worth investigation.

Mr. Bilson, like Dehio and von Bezold, has no doubt about the intention of the Normans to vault all the main spans of their churches, and relies on the shaft which rises from the front of the main piers towards the roof, and which "can have no other motive than to support a vault," and "cannot have been the support of a mere tie-beam." There is, of course, a third alternative, that the shaft in question may have been planned to carry an undergirding arch such as occurs below the wooden roofs of Sta. Prassede, Rome, San Miniato, Florence, and nearer home at Notre Dame du Pré, le Mans, and elsewhere. Later on, the Normans adopted this form in the intermediate undergirding arch of quadripartite vaults, as at Bernières, near Caen, and it is conceivable that the arrangement of Notre Dame du Pré was contemplated at Jumièges. On the other hand, Jumièges shows the Norman predilection for stone roofs in its vaulted triforium, and this feature may even have occurred much earlier in the church dedicated at Fécamp in 990, under Duke Richard I., for a contemporary writer tells us that this was *dupliciter arcuatum mirabiliter*.

Mr. Bilson's careful and elaborate paper is a contribution of much importance to a controversy that will take some time to settle, for as a recent writer remarks: "The science of the Gothic style is still in its youth."

From W. Wonnacott [*A.*]—

With reference to Durham Cathedral, I was hoping that Mr. Bilson, in the early part of his paper, would have presented to his audience a *plan* of the church. There is one peculiarity of this design which, to my mind, has never yet been satisfactorily explained. That is the alternate grouped piers and cylindrical shafts, which were used first in the choir by William of Saint-Calais in 1093; and six years later in the nave by his successor, Flambard. From end to end the design is the same, and Flambard adopted the plan of his predecessor for the completion of his work with but very minor constructive alterations. But we see, in the choir, how the large double bays were intended to be vaulted, triple shafts being attached to the walls over the cylindical shafts for the avowed purpose of carrying a member or group of members of the intended vaulting. Mr. Bilson has shown also in the transepts similar evidence of an intended vault, at first temporarily abandoned, but ultimately adopted with the trifling variation of double (instead of triple) attached shafts at the triforium level, to carry some one or more of the vaulting members. But when we come to the nave, the cylindrical shafts occur without any evidence whatever that a stone vault was intended, not even the meaningless single shafts which run up to the roof in such examples as Ely and Peterborough, and also at Cérisy, and formerly at Norwich (anterior to 1446). Clearly the existing nave vault was not intended in its present form; was it to be a sexpartite vault (either pure or bastard), or was the nave to have a timber roof? Mr. Bilson will perhaps deny the former assumption, as he has already taken his ground [p. 318, *ante*] in stating it was much too early for a sexpartite vault, that "obviously the quadripartite vault was the earlier form," and summons Herr Dehio to support him in showing that the other varieties must have been developed from the quadripartite, and finally that we must all ultimately come round to this view, the only *evidence* he offers to effect this being the profiles of the rib mouldings.

But I should like it stated on clearer grounds than this why Mr. Bilson thinks the sexpartite vault or a timber roof could not have been here employed. Flambard in 1099 must have had some reason for perpetuating in his own work the principles expressed in that of his immediate predecessor. In the one case, it is clearly proved vaults were intended, and originally were constructed; in the other, perhaps, a similar construction was first intended and afterwards totally abandoned. But what was to be substituted?

Referring to the illustrations at the meeting, Mr. Bilson showed us first the ungroined vault, on the Roman model, without any transverse arches as at Caen (La Trinité), and then at one step we were taken through a series of illustrations in which the permanent centre, or *cut-stone arch*, was adopted, without any transition, as Canterbury crypt and Durham crypt. But Mr. Bilson leaves unexplored a rich field in omitting the very numerous examples of early Norman work where the arches were first formed *in rubble*, and were really parts of the web, also in rubble; these were then plastered to look like an arch, but were not so in their true sense. There are many of these, some of them fine examples, still existing in crypts, chapterhouses, arched gateways, and chapels, such as Worcester, St. Peter's, Oxford; in the later ones we see the springings of these arches, and sometimes even of the vaults themselves, in *cut stone* (as Winchester crypt and transepts); sometimes the *groins* are in cut stone, the web and transverse arches being still in rubble. Another device, fruitful in examples, was the peculiar emphasis given to the wavy or ogee-like groins often to be found in the oblong and trapezoidal bays of Norman work, where the twisted groin was brought to a boldly projecting arris in the plaster, which gradually died away as it neared the key of the vault (examples at Worcester and Canterbury crypt). Willis has expressed his opinion that the Normans were pleased with this form, and that it was appreciated and developed by them as an element of variety and beauty.

May I refer to a slight slip made by the author in that he refers to the ashlar springers of the vaults (p. 293) of Winchester crypt and transepts, 1079 and 1093 respectively; but in a footnote on p. 304 he states it was not till the end of the *twelfth* century that solid stone springers were introduced. The latter observation, I presume, refers to the *tas-de-charge* of ribbed vaults, though in both instances the constructive principle is the same.

I append a few dates in a tabulated form, believing they will be of assistance to students of our architectural history.

DATE	NAME OF WORK	DESCRIPTION OF VAULTS	BUILT BY	AUTHORITIES
1070	Canterbury	—	Lanfranc made archbishop.	
1070–1080	Westminster; undercroft of dormitory and refectory	Transverse arches and secondary pilaster.	Continuation of the Confessor's work.	
1072	Durham Castle: crypt.	Transverse arches.	Commenced by William the Conqueror.	
1073	Caen: choir of St. Stephen's consecrated.	—	—	*Chronicon S. Stephani Cadomiensis.*
1077	St. Alban's: aisles.	—	—	
1077–1082	Rochester: crypt under choir.	Groined, *i.e.* unribbed.	Bishop Gundulf.	See W. St. John, *Archæologia*, xlix. 32.
1078–1088	Lastingham: crypt.	Transverse arches.	By monks from Whitby.	
1079	Winchester: crypt; church commenced.	Transverse arches with secondary pilaster.	Bishop Walkelin.	
circa 1080	Tower of London: chapel aisles.	—	Bishop Gundulf.	
1081 (or 1073)	St. Stephen's, Caen: completed and dedicated.	-	—	Chronicon Goferni.
1084	Worcester: crypt.	Tranverse arches in rubble.	Bishop Wolstan.	Willis, *Worcester Cathedral.* MS. dated 1092.
1088	Blyth church founded.			
1088–1091	*Durham*: undercroft of refectory.	—	During exile of Bishop William of Saint Calais.	Rev. W. Greenwell, *Durham Cathedral.*
1089	Gloucester: rebuilding commenced and eastern part completed by 1100.	Ambulatory of crypt unribbed.*	Abbot Serlo.	Willis.
circa 1090	Beauvais: St. Lucien's church commenced.			
1092	Lincoln: nave vault.	Ribbed vault, circular curves.	Bishop Remigius.	
1093	*Durham*: foundation stones laid, choir and aisle vaults commenced.	First use of ribbed vault triple shafts to receive ribs.	Bishop William of Saint-Calais.	
1093	Winchester: monks completed church.	- —	Bishop Walkelin.	
1096	*Durham*: Symeon's History ends in this year—aisle vaults of choir completed.	—	Bishop William died.	
1096	Canterbury: crypt.	Transverse arches—plastered.	Bishop Ernulf.	Willis.

* Diagonal ribs here are later work, probably 1100–1115.

DATE	NAME OF WORK	DESCRIPTION OF VAULTS	BUILT BY	AUTHORITIES
1099	*Durham*: choir and transept vaults completed and nave aisle vaults commenced.	Ribbed vaults, triple shafts employed (except to cylindrical nave piers).	Ralph Flambard became bishop.	
1100	Gloucester: choir dedicated, nave commenced.	Ribbed vaults to aisles, circular curves.	Abbot Serlo.	
1100–1107	Ely: nave and aisles.	Transverse arches, with shafts supporting the groins.	Design attributed to Abbot Richard; probably not entirely carried out by him.	Rev. D. J. Stewart, *Ely Cathedral.*
1104	*Durham*: main vault of choir completed and translation of St. Cuthbert's body to the shrine.	—	Ralph Flambard proceeding with the nave.	
1107	Winchester: central tower fell.	—		
1107–1110	Transept and aisle vaults partly reconstructed.	Ribbed vaults.		
circa 1110	Romsey Abbey: choir aisles (in early work).	Unribbed intended, but ribs used; one shaft only.	—	No documentary evidence.
1114	Rochester.	—	Ernulf became bishop.	Willis.
1116	Peterborough burnt.	—		
1117–1118	Peterborough: present church commenced.	— Ribbed vaults, circular curves.		
1120	St. Aignan-la-Cité: chapel.	Unribbed.		
circa 1120	Morienval.	Ribbed, circular curves.		
circa 1120	Southwell.	Ribbed vaults, circular curves.		
circa 1120–1130	Warkworth church.	Ribbed.		
1123	St. Bartholomew, Smithfield, founded.			
1123	Tewkesbury dedicated.			
circa 1124	Dunfermline.	Ribbed, circular curves, triple shafts.		
1125	Cambronne-les-Clermont.			
circa 1125–1130	Devizes. St. John's and St. Mary's: chancels.	Ribbed vaults, circular curves and clustered shafts.		
1128	*Durham*: nave vault commenced.	Ribbed, pointed arches.	Bishop Ralph Flambard died.	
circa 1128	Lindisfarne.	Ribbed circular curves, triple shafts.	Edward.	Reginald of Durham. MS. 1165 A.D.
circa 1130	Vezelay: porch.	Pointed arches, groins unribbed.	—	Viollet le Duc, *Construction.*
1133	*Durham*: nave vaults completed, chapter house vaulted.	Ribbed circular curves.	Geoffrey Rufus succeeded Flambard.	
1137–1140	Saint-Denis: vaults under west towers.	Arches all pointed.	Suger's work.	Viollet le Duc.
circa 1139	Malmesbury: nave aisles.	Ribbed diagonal, semicircular, pointed arches, triple shafts on walls.	Attributed to Bishop Roger (died 1139).	
1140 or 1143	Peterboro': choir and part of transepts completed and monks entered church.	Ribbed circular curves, triple shafts on walls (not on piers).		
1140	Sens commenced. St.-Denis narthex completed.			
1141	Lincoln: nave burnt, new vaulting.	Ribbed.	Bishop Alexander.	*Giraldus Cambrensis.*
1144	St.-Denis: choir completed.			

INCORP.
1837
1887

9, Conduit Street, London, W., *25th March* 1899.

CHRONICLE.

President of the Glasgow Institute elected Fellow.

The Council, at their meeting of the 6th inst., acting under the proviso to By-law 9, whereby they are empowered to elect to the Fellowship the President of any Allied Society who is eligible and applies for admission, duly elected the following gentleman Fellow of the Royal Institute:

David Barclay, of 245, St. Vincent Street, Glasgow, President of the Glasgow Institute of Architects.

The New Vauxhall Bridge.

In consequence of the letter of protest published in *The Times* of the 6th inst. [p. 275], Mr. Ward, the Chairman of the Bridges Committee, made a statement at the meeting of the London County Council on the 7th inst., to the effect that several deputations from the Art Committee of the Institute had been received by the Bridges Committee, and that the engineer had received a letter from Mr. A. Waterhouse, R.A., congratulating him on his design. By way of public rejoinder to this statement, the following letter addressed to the Clerk of the London County Council by the Secretary of the Institute on the 21st February was published in *The Times* of the 10th inst.:—

"The Council of the Royal Institute of British Architects has had before it your letter of the 30th ult., and I am directed in reply to point out that the request of my Council was that the Chairman of the London County Council should receive a deputation, whereas the matter seems to have been referred only to the Bridges Committee. I have to state also that the communications which have passed between this Institute and the London County Council—dating back to 1894—have been almost entirely confined to the construction of an iron bridge with stone piers, a form of construction originally insisted upon by the Bridges Committee, but subsequently abandoned. Of such a bridge my Council laid before the Bridges Committee (at the Bridges Committee's request), with certain suggestions, drawings and details to scale, and not only a sketch as stated in your letter. Details, suggestions, and criticisms dealing with an iron structure are not, however, applicable to one completely dressed in stone, and the only inter-communication afforded by the engineer in reference to the stone-clad design (recently made public) has been the interview alluded to in your letter between Sir A. Binnie and Mr. Waterhouse and Mr. Mountford, which interview was, at Sir A. Binnie's instance, to be considered informal and confidential. My Council much regret, upon public grounds, that the London Council has refused to see a deputation which would have expressed the views of many of the leading architects of the day upon the design for so costly and important a public monument. At the same time, I am to express surprise that the London County Council should have fallen back upon an expressly confidential letter and interview to base its refusal, more especially when my Council have had no opportunity of seeing the design or forming an opinion upon it until its recent publication. It appears, moreover, that the suggestions made by Mr. Waterhouse and Mr. Mountford for rendering the design less objectionable (which were more far-reaching than might at first sight appear) have been entirely ignored, and Mr. Waterhouse states that an interpretation has been put upon his letter which he never intended to convey. The Royal Institute of British Architects, having much at heart the architectural quality of the public monuments of London, greatly regrets the unwillingness of the London County Council to reconsider a design which is undignified and unworthy of its destiny, and will, in spite of the costly nature of its architectural accessories, reflect so little credit upon contemporary architecture, upon London, and upon the London County Council."

A deputation of the Institute was received by the Chairman of the London County Council on the 10th inst., and their report is now under the consideration of the Council.

The New A.R.A.

At a General Meeting of Academicians and Associates of the Royal Academy, held on Thursday evening the 23rd inst., Mr. Aston Webb [*F.*] was elected an Associate.

The Northern Architectural Association.

Mr. W. Glover, recently installed in the Presidential chair of the Northern Association, is prepared to give generous aid towards the attainment by the Association of the following desirable objects:—(1) A building to be its home; (2) a good library; (3) prizes for students. For the first he offers 100 guineas if members will raise 900; for the second he promises 25 guineas if members will contribute 75; and for the third he will give 25 guineas if members will give 75. He further offers to double his donations if members will double their help. This would raise 2,000 guineas for the building, 200 guineas for the library, and 200 guineas for a students' fund, the interest of the latter to be devoted to prizes. Mr. Glover, it will be remembered, a few months ago presented the Association with a new Presidential Badge, which was illustrated in the last volume of the JOURNAL, p. 207.

Secret Commissions.

In the last issue of the JOURNAL (p. 283) reference was made under the above heading to a letter from a firm of billiard-table makers, offering a Fellow of the Institute a commission of 5 per cent. Another, though not so flagrant an instance of bribery has since come to hand in the shape of a trade circular from Messrs. Carver and Company, a firm of wall-paper manufacturers in Berners Street, enclosing a leaflet that bears the legend:—"A Free Gift to Architects. Owen Jones's *Grammar of Ornament*. 5 guineas Edition. Architects desiring the above work would oblige by making written application for same." Perhaps firms who advertise by these methods do not realise that they are insulting a professional man by sending him such a circular.

Obituary.

News has just been received of the deaths in September last of Frederick Mew, of 9, Gordon Street, W.C., and William Reddall, of 10, South Street, Finsbury, E.C. Mr. Mew was one of the oldest Associates of the Institute, having been admitted in 1859. Mr. Reddall had been an Associate since 1874.

LEGAL.

THE LONDON BUILDING ACTS.

Building Line.

At the Clerkenwell Police Court, on 8th March, Mr. Horace Smith had to determine a dispute between the London County Council and Mr. W. H. Scott, of the Vernon Arms, Pentonville, arising on an objection in writing, under section 150 of the London Building Act, 1894, to the erection by him of 180 and 182 Pentonville Road. The material facts, as stated to the Court by counsel for Mr. Scott and reported in the *Law Journal*, are as follows:—The appellant was desirous of pulling down and rebuilding Nos. 180 and 182 Pentonville Road, No. 180 being the Vernon Arms, at the corner of Southampton Street. The houses between Southampton Street and Winchester Street, leading from Pentonville Road, were some set back with a forecourt, and others flush up to the pavement. Mr. Scott applied to the Council in July last for leave to build, when assent was withheld on the ground that they proposed to disturb the line of building. The appellant then petitioned to "deviate" under section 43 (2) of the Act. To this the Council replied that the proposed deviation was not such as was contemplated under the section, and that therefore they had no power in the matter. They declined to give a decision. The result was that Mr. Scott was prevented from applying to a tribunal of three experts as provided for in the Act. The County Council next called upon the superintending architect to define the building line between Southampton Street and Winchester Street, and certified that the main frontage of the buildings formed the general line of building. But the superintending architect omitted all reference to section 22 (2), which said that section 22 should not apply to any buildings erected seven years prior to the commencement of the Act of 1894. These buildings existed long before seven years prior to the Act. Mr. Scott, taking the next step necessary, served a building notice upon the surveyor, and the surveyor refused his consent to the proceedings because they proposed to build beyond the line of building without the consent of the County Council. This brought the case to that Court. It was contended for the Council that the architect had not defined his own line of building, but the line of building as it existed. The whole question was, were these buildings "lawfully" occupied as meant in section 22 (2)? Their erection had never been sanctioned, and an old Act of 1756 prohibited building within fifty feet of the centre of this road. In the reign of George IV. this Act was repealed, and another passed prohibiting buildings within forty-six feet of the road centre. That Act remained in force until the Metropolis Management Act of 1862. No one could acquire a prescriptive right against the Crown, so that the fact that these buildings had been allowed did not affect the case. The fact that they had not been sanctioned by the old Metropolitan Board of Works showed that they were not lawfully erected within the meaning of the Act.—Mr. Horace Smith decided in favour of the Council, but offered to state a case for the High Court.

MINUTES. X.

At the Tenth General Meeting (Ordinary) of the Session 1898–99, held Monday, 20th March 1899, at 8 p.m., Professor Aitchison, R.A., *President*, in the Chair, with 14 Fellows (including 7 members of the Council), 22 Associates (including 1 member of the Council), 1 Hon. Associate, and several visitors, the Minutes of the Special and Ordinary Meetings of the 6th March [p. 287] were taken as read and signed as correct.

The decease was announced of Frederick Mew and William Reddall, *Associates*.

The following Associates, attending for the first time since their election, were formally admitted and signed the Register—viz. Arthur Maryon Watson, B.A., Ernest Jesse Mager, and Rupert Claude Austin.

A Paper by Mr. John Bilson [*F.*] on NORMAN VAULTING IN ENGLAND having been read and illustrated by lantern slides, a discussion ensued, and a vote of thanks was passed to the author by acclamation.

The proceedings then closed, and the Meeting separated at 10.15 p.m.

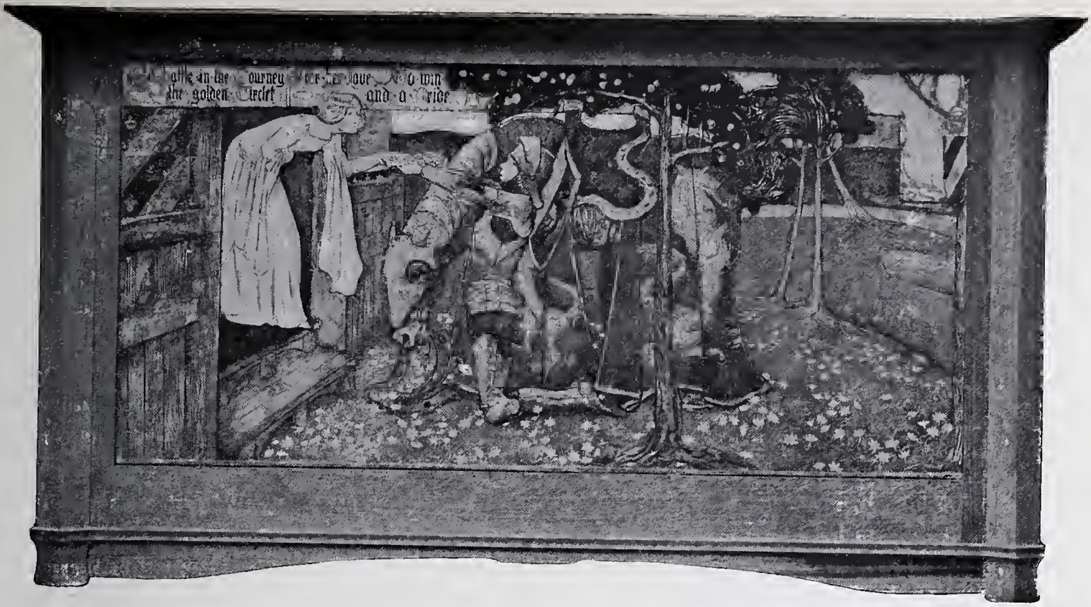
attle in the ourney for love o win
the golden Circlet and a rice

FIG. 1.—Coloured Plaster Relief by Gerald Moira and F. Lynn Jenkins.

THE APPLICATION OF COLOUR TO INTERIOR ORNAMENT IN RELIEF.

By H. VAUGHAN LANCHESTER [*A.*] and F. LYNN JENKINS.

Read before the Royal Institute of British Architects, Monday, 10th April 1899.

I. By H. VAUGHAN LANCHESTER [*A.*].

THOUGH the title of the subject under discussion to-night suggests its limitation to colour only, so frequently is the question of form and relief of first importance that I must ask your indulgence if these remarks somewhat overstep the stated limits, and deal with the massing and treatment both of colour and form when applied to internal decoration.

Perhaps the principal reason for the importance that fairly full colour usually takes in most of our schemes for internal decoration is connected with the frequent inclemency of our climate. Whereas, in the South, it is desired that wall painting and ornament should have an open and airy effect, with us the point on which most insistence is placed is the enclosing and protecting capacity of the building, and many of the lighter and more delicate styles of treatment are felt to be insufficient to secure this. At the same time, the fact of using modelled work as a basis for colour treatment, of itself gives a solidity and strength that enables the painting to be kept in a more delicate key than would otherwise be thought satisfactory.

The relief also, when considered with the view of bonding the sculptor's work and the architectural detail, is most helpful in connecting the work with the mouldings and forms around it in a way that no flat-painted work could possibly do; and if the design of the whole interior is studied by the architect and sculptor in conjunction, the result should be far beyond the very frequent method by which the architect leaves a space here labelled "Sculpture," or a panel there marked "Painting." This is perhaps not so noticeable where the part given into the sculptor's hands consists of some individual feature, such as a fireplace or a doorway, and the surroundings afford a comparatively unobtrusive background. Where, however, the sculptor's work of necessity forms an integral part of the design, as in ceiling, cove, or frieze, it is essential that some mutual concessions should be made.

The sculptor naturally asks for as much freedom as possible, while the tendency of the architect's idea is towards formality and symmetry. For instance, the architect would probably, if left to his own devices, place at intervals some kind of supporting member connecting other portions of the design; while it would be the sculptor's part to show that such could be dispensed with, and that the disposition and handling of his modelled surfaces would render it superfluous.

A frieze, if the relief and colour are in harmony with the other decoration of the room for which it is designed, can satisfactorily extend without interruption if there is no very marked concentration of the weight of roof or ceiling over; and it will in this way not only permit the subject to be handled with more breadth and dignity, but will give a freedom as to depth and scale that may by its consequent flexibility render it of much greater service in giving the best proportion to the room. It may, I think, be taken as an almost invariable rule that an uninterrupted frieze gives length to the surface on which it is placed by the horizontal stratified effect so obtained, and that the more the frieze is cut up into sections, the less will the modification in proportion appear.

It cannot fail to be recognised that the more any real or apparent weight comes on any given portion of a building, the more rigid and severe must be the decoration on the supporting part. Nevertheless, while it would be impossible to let substantial ribs or beams rest over a frieze of open character, yet by massing the figures and keeping to a strongly marked vertical treatment a continuous frieze would frequently have the happiest effect.

While pressing most strongly the claims of the undivided frieze as a satisfactory form of decoration, it must, however, be admitted that it is not always the most suitable form to adopt, and that its comparatively uniform continuity of colour and modelling is not always what is most to be desired. A certain massing of either or both at intervals may, without cutting it up into disconnected panels, give the desirable suggestion of repetition to the frieze, and at the same time suggest a sense of support or connection between other portions of the whole design. This treatment rather suggests a greater degree of solidity and higher relief in the supporting or dividing portions, though the same end might be attained by giving them more severity of form; but in the latter case the frieze approximates to a series of rectilinear panels, such as one sees where it is divided by columns or pilasters.

You may perhaps think that my attention has been somewhat concentrated on the frieze, but, as a matter of fact, of the spaces that the architect usually puts at the disposal of the decorator, the frieze is at the same time the most interesting and the one offering the greatest variety in its requirements; it may consist of simple repetition of somewhat severely conventional forms, or it may teem with variety when it illustrates the great events connected with place or people, and thus thrill its beholder with patriotic or municipal pride. It boasts an antiquity which can be claimed by few other forms of decoration, and comprises some of the noblest work in all the ages.

Vaults and ceilings, it is true, give exceptional opportunities to the sculptor, but he can rarely put into them work having the same human and personal interest that the vertical surface of the wall allows, as in most cases the decoration must be of a more structural and conventional character. A large lunette at the end of a barrel vault is one of the happiest pieces of work to undertake; the arch over relieves one from the necessity of consulting the apparent structural limitations that occur in the frieze, and admits an openness of design that might elsewhere be difficult. Moreover, it is a position that inevitably suggests a decorative treatment, and can usually be conveniently seen, even though at a considerable height. At this stage it would not be amiss to take into consideration the actual methods by which this kind of work may be executed; it will suggest the effects that can best be aimed at in various cases.

Something, of course, depends on whether the designer has had more a painter's or a

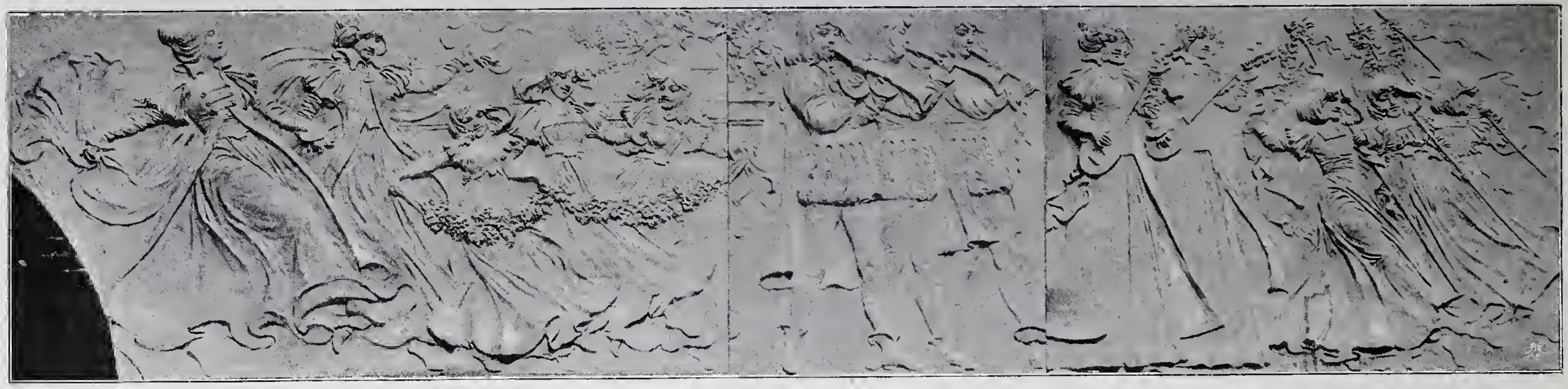

FIG. 2.—PORTION OF FRIEZE AT KINGSWOOD.

H. C. Fehr sc.

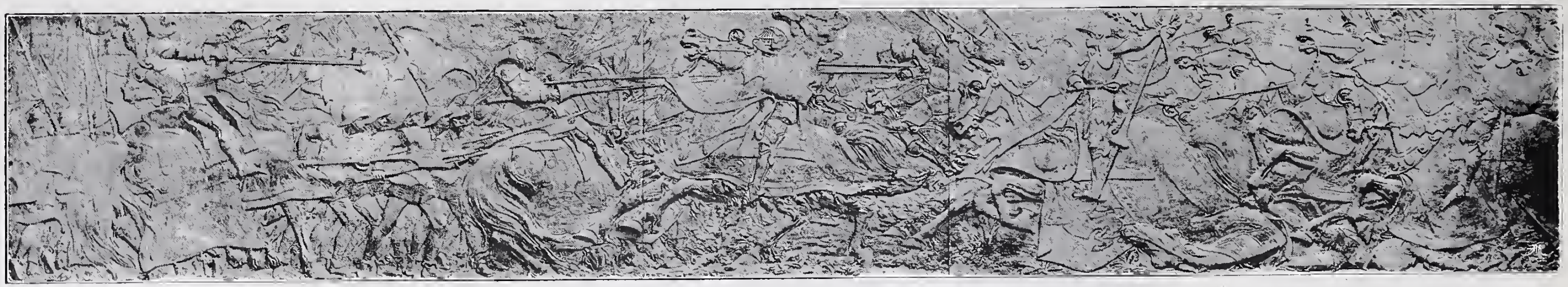

FIG. 3.—PORTION OF FRIEZE, COUNCIL CHAMBER, WAKEFIELD, PREVIOUS TO COLOURING.

H. C. Fehr sc.

sculptor's training; the painter will probably rely more for his detail and light and shade on the strength of his pigments, only using the embossing of the surface here and there to assist them; he will generally adopt some form of gesso, with plaster, glue, and cotton-wool, or canvas dipped in plaster, applied to the level ground where he requires relief. The sculptor, on the other hand, sees his work primarily as a modelled surface on which he places colour more evenly, only, as a rule, reinforcing the light and shade of the modelling to the extent that transparent colour runs naturally into hollow places.

The details of the sculptor's method may be described as follows :—A ground is prepared of similar form to the surface on which the work is to be placed. This is spread with clay on which the work is modelled, the relief rarely exceeding three-quarters of an inch in any part. When it is complete an ordinary waste-mould is cast from this, and fibrous plaster (with a backing of coarse scrim) is worked into it. This plaster can be stiffened at intervals with laths or battens, and can have a light frame following the edges if they require stiffening; but it is, as you know, very light and need not exceed an inch in thickness. This is very important when it is required to decorate an existing wall, as it may obviate the necessity for cutting away and the consequent mess and dust. If any part of the design is repeated, a gelatine mould can be made from this first cast, and from this any number of subsequent repetitions can be made.

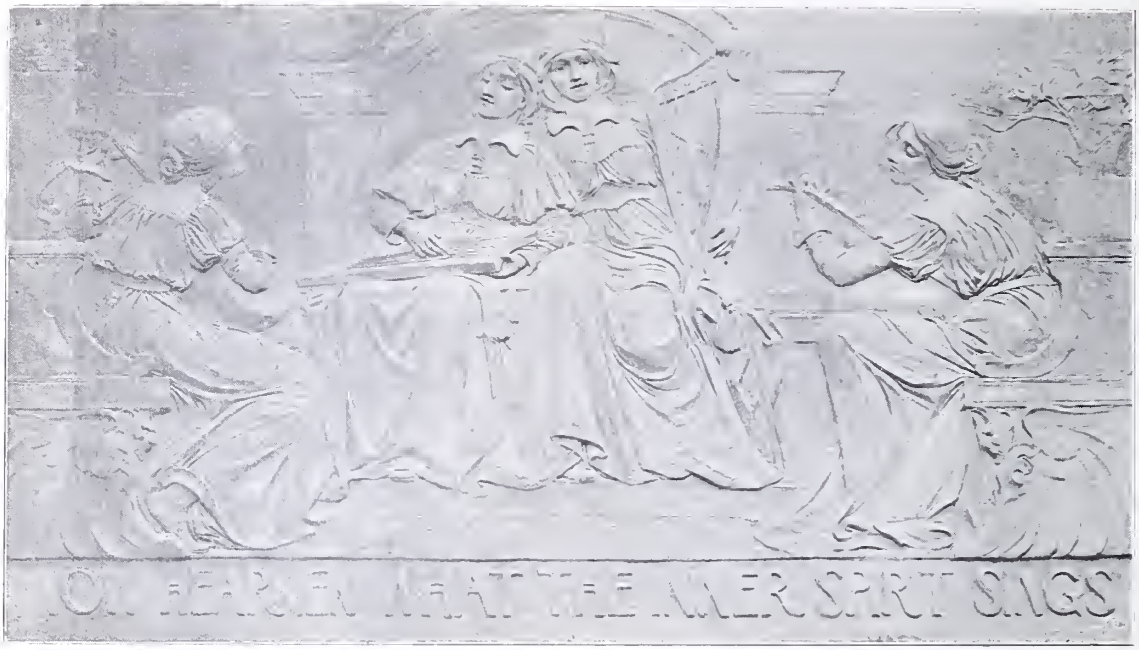

FIG. 4.—PORTION OF FRIEZE IN PRIVATE HOUSE. *H. C. Fehr sc.*

The work having been cast and fixed in position, all joints stopped, &c., the surface is prepared with white shellac until it has a uniform shine; this is essential, to prevent colour soaking in and looking irregular, opaque, and weak. Then any metal that may be required is put on, with real gold leaf and aluminium leaf, aluminium being preferred to silver on account of the tendency of the latter to go black. The whole surface is next coloured with ordinary oil pigments in a permanent medium (translucent colours being used as far as possible), a coating of the medium being taken over all metal, when, if desired, its colour can be slightly modified by thinly mixed pigment. Metal should in all cases be used with caution, as it shows dark if not in a position to reflect light from any window or other opening; consequently, if placed next to light colouring, it will frequently make rather a hard line.

Where a room is top-lighted metal can be used with more freedom, as one can rely on its reflecting light to the eye from some point or another. It also forms an excellent background for figure design when the massing of the figures is carefully studied, and all edges are softened into it a little by judicious tinting, so as to suggest a soft ivory colour.

It may be noted that all colours will inevitably be somewhat yellowed by the colour of the plaster and shellac. This, however, as a rule, conduces to softness of effect, though rendering the task of getting a bright clear blue very difficult.

A very great merit that this method of decoration possesses lies in the fact that it may be considered almost indestructible. Unlike fresco, it is not affected by damp, and its durability can only be considered limited by the plaster which forms its basis.

The unsatisfactory effect of oil painting used to simulate fresco is, I think, familiar to us all, whereas the adoption of translucent colour, assisted by modelled surface, gives a technique that is both vigorous and decorative.

The combination of relief with colour is not only valuable where the figure forms the basis of the design, but it also enables us to deal in an interesting way with decoration based on landscape, architectural, and other forms, and varying according to the subject and the dependence placed on the relief and on the colour. In landscape, for instance, the relief would probably be light and the colour vigorous; while in an architectural treatment the reverse might be preferred. At all times, if the scheme of decoration is suitable, a delightful effect can be obtained by using colour very sparingly, as mere suggestion, such as one might do for a statue in the round. In ceilings, for instance, where colouring should always be delicate unless supported by very strong architectural forms, this kind of colour would be satisfactory.

Up to the present we have been regarding our design and decoration as untrammelled; but it may occur that it may be desired to embody existing pictures or sculpture in the decoration, in which case they would probably give a note as to treatment and colour. A commission was, I believe, recently given to complete a room as setting to a series of Reynolds and Gainsborough pictures, and one can imagine what an interesting effect a series of noble pictures would make connected and framed up by bold sculpturesque work sufficiently conventionalised. How much also might be made of figures in the round, either in coloured plaster or metal, jewelled with such materials as mother-of-pearl, ivory, or enamel, and set at intervals in a background of rich deep-toned wood panelling and carving, or, assuming the cost of this prohibitive, executing just a fireplace or doorway in some such manner!

I know that in closing my remarks at this point I am leaving large tracts of the subject of our discussion unexplored, such as the technique of mosaic, the rival claims of form and colour, and the extent to which sculpture may be permitted to be given structural functions. These are, however, questions so important in themselves, that they seem almost beyond our programme to-night, considering the variety of aspects from which I have no doubt many of you will regard the questions that have already been raised.

II. By F. Lynn Jenkins.

I HAVE prepared this paper in response to the kind invitation of your Council that either Mr. Gerald Moira or myself should read a few words on the subject of so-called Coloured Reliefs. I think you will agree that it is hardly necessary for me to apologise for constant reference to our own joint efforts, as I can only attempt to demonstrate points by the light of our own personal experience. As many of you know, we have, for the past three years or more, been associated together in this style of work, which is to many intents a revival of one of the methods of decoration of the Middle Ages.

It may be interesting at the outset to give a few reasons for our active sympathy with this revival, more especially as it has fallen to our lot to be almost the first to whom opportunity has been given to test its present utility on a comparatively large scale.

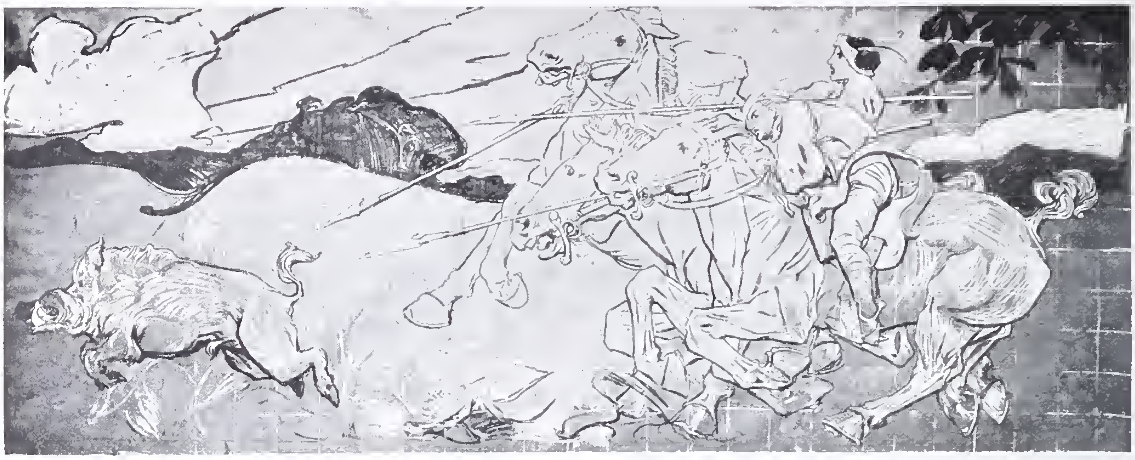

FIG. 5.—THE BOAR HUNT. CARTOON BY GERALD MOIRA.*

It is generally admitted that the art of every age should breathe the essence of the time which produces it ; most certain it is that the work which complies with this condition will not only give satisfaction by reason of its fitness, but will be of infinite historical value in the future. It naturally follows that the present time, distinguished by its extraordinary inventions in every direction, should exercise a decided influence in consequence on the decorative art of the day. Greater facilities, new materials, wider technical knowledge—these and many other conditions must surely be felt in a marked degree by art-workers, and evinced in what they do.

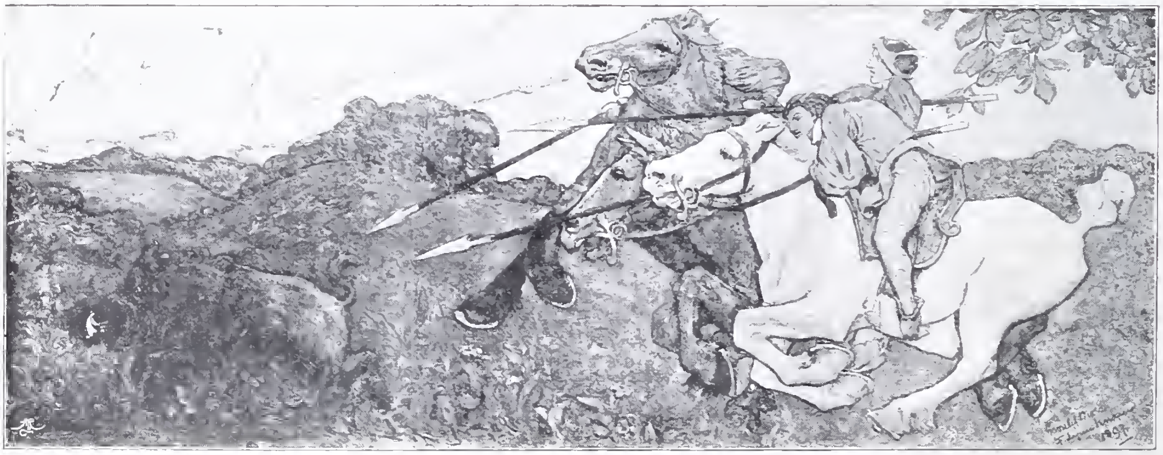

FIG. 6.—PANEL AT THE TROCADERO, BY GERALD MOIRA AND F. LYNN JENKINS.

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* Blocks of illustrations figs. 1, 5, 7, and 10, which originally appeared in *The Studio*, have been kindly lent by the Editor of that magazine for the purpose of this Paper.

Another striking characteristic of this present day is the demand for lavishly decorated buildings, whether private or public, certainly as regards the latter. I suppose there never has been a time when long-continued peace and prosperity have created such an almost unhealthy craving for luxury among all classes. Each new hotel, restaurant, or place of amusement has to vie with and, if possible, go one better in point of extravagant decoration than its predecessor, and the architect must often experience the greatest difficulty in complying with his client's demands, sometimes, I fear, at the expense of his own natural good judgment and taste.

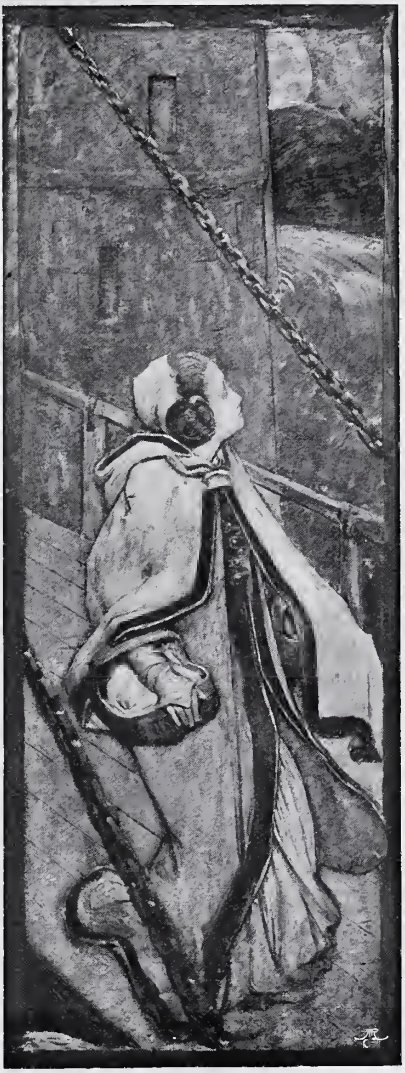

FIG. 8.—ENID CROSSING THE DRAWBRIDGE. TROCADERO PANEL. BY GERALD MOIRA AND F. LYNN JENKINS.

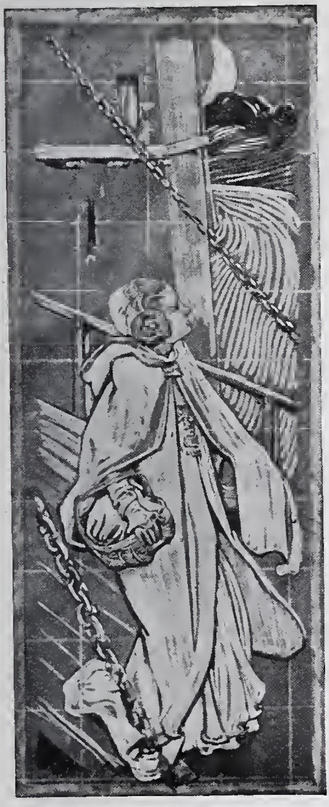

FIG. 7.—CARTOON BY GERALD MOIRA.

There are, as far as I can see, two distinct methods of decorating a room now in vogue: the first, and unfortunately the most prevalent, where every detail from floor to ceiling, furniture, and fittings is made elaborate and ornate, and emphasised in every possible way with gold and colour, producing a chaotic effect of glitter and unrest; the second treatment, where a quiet effect of restful luxury is obtained by the skilful distribution of large and harmonious masses of decoration contrasted with extreme simplicity. All this may appear to have but little bearing on the subject under discussion. I have, however, felt it necessary to explain the position in which the decorative artist finds himself at present. He is asked, perhaps, to provide a decoration which shall be durable, brilliant in colour, and effective, in conjunction with surroundings over which he has little or no control. Plain modelled relief, even if tinted monochromatically, is not sufficiently brilliant, and, if modelled to look well in its position by the light of day, is too often altogether spoilt in effect when seen by artificial light. Painting or fresco is apt to be dull or unsuitable, and is by no means durable in towns where there is always the chemical action of smoke and gas at work, besides being almost impossible to keep clean. Another material, known as Della Robbia, when seen in this country, is of necessity cold and hard, limited in colour schemes, and what artistic effect it may have is utterly spoilt by the horrible glaze inseparable from such a medium. Therefore, it would seem that the necessity has arisen for a decorative material which shall above all be durable and easily cleaned, which shall be capable of varied and rich treatment of surface, relief, and texture, and can be permanently coloured to any key of brilliancy and enriched with metals. These properties, we believe, are embodied in the material known generally as coloured plaster relief work, and should prove almost sufficient reason for its production and use.

Again, while it has been for some time the custom, more especially in private houses, to paper the walls and hang pictures upon them as decoration, it is now becoming more and more apparent how false a notion this is, and how extremely difficult it is to get any satisfactory effect by placing indiscriminately on a wall subject-pictures of varied styles and colours, with little harmony to their surroundings or to each other, which give offence to a sensitive eye. How many rooms which have been the subject of infinite care on the part of the architect are spoilt by the owners through such careless treatment! And do what you will, pictures will seldom hang straight. I can hardly conceive anything more pathetic than an architect having to sit at dinner opposite a picture which is half an inch out of perpendicular. The revival of the old method of designing and making such decorations as are required as part and parcel of the scheme of the room must surely be a matter for congratulation, and is a movement the influence of which is bound to be widespread by reason of its truth of principle, and also because even the unanalytical mind will grow to perceive its advantages without knowing why. Here, again, the use of coloured relief would often be found serviceable.

I purpose now to briefly describe the material and method of its production. The plaster used is refined plaster of Paris, which is cast with fibre or tow, and is very thin and light in weight, though extremely strong. But it is not ordinary plaster, as in the process a particular medium is employed with the effect of producing a much more durable and harder material than usual. I am not allowed for several reasons to tell you what this medium is. The colours are of two kinds, powder colours, which are mixed with a medium which drives them into the perfectly dry and absorptive plaster, and at the same time locks them there and renders the surface of the plaster henceforth impervious to damp action or absorption. Metal is employed on the surfaces required, leaf metal twice gilded or silvered, as the case may be. We find by experience that aluminium is preferable to silver leaf, as it produces the same effect and is practically untarnishable. On this first layer of colour, which has become part of the fabric itself, oil colour is used freely, and when this is quite dry the whole is coated with a peculiar spirit glaze which entirely locks all colour and metal from the action of the atmosphere. This surface will then, if necessary, receive a dull gloss, and can be washed without damage. It may be interesting at this point to note the difference between the method we employ and what can be gathered by a careful and minute study of the coloured stucco reliefs in Italy of fifteenth-century date. In these latter the stucco colour was apparently applied simply as a coat on a hard material, usually terra-cotta or stone, almost in the same way as whitewash to a wall. No great effort seems to have been taken to make the colour applied part of the material, with the inevitable result that much beautiful work has become in course of time spoilt by the colour surface cracking away. We claim for our method more lasting results by reason of the use of a sympathetic and receptive ground. The examples of Della Robbia work also seem to have suffered by process of time, as in nearly every instance there are considerable portions of the glaze cracked away, leaving bare the surface of the modelling underneath.

The plan adopted in the working of our reliefs is somewhat governed by the fact that we collaborate in their production. A coloured scale sketch of the design is first prepared by Mr. Moira to our mutual satisfaction. Then from this design he makes a full-size cartoon in charcoal and white chalk on brown paper, using the square system for enlarge-

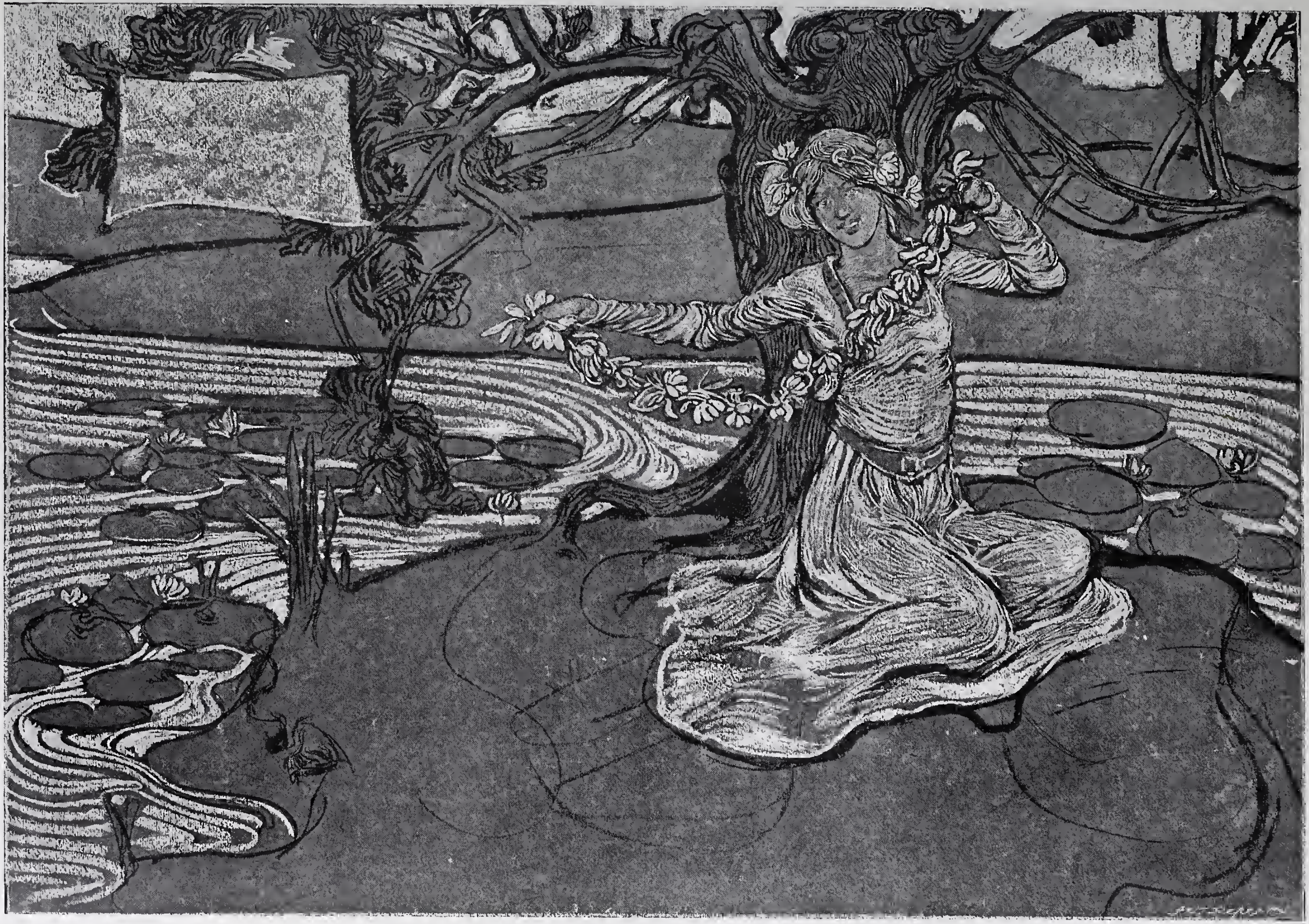

FIG. 9.—OPHELIA. CARTOON BY GERALD MOIRA.

ment. The clay slab having been prepared, the cartoon is laid on it, and the main lines are carefully traced through. I then model the whole design, using these guiding lines and obtaining the requisite relief, planes, texture, and surface, and elaborating, as we feel necessary, where the cartoon merely suggested. Here I may note that experience has taught that this relief can in no respect be considered according to the usual laws governing bas-reliefs, but must be modelled strictly with a view to the reception of colour This often necessitates the forcing of plane values, and, above all, the immense importance of a variety of texture on the surface of the clay. The quality of the colour depends so much on the texture of the surface underneath that it requires not a little experience and many experiments to obtain good results, and one feels that as this experience ripens, it will be possible to get almost any effect. For not only can differences of value be obtained by means of the quality of the modelled surfaces, but the paint also can be applied to the plaster in so many different ways, and the peculiar properties of the material when treated with the special mediums I have mentioned enables the painter, among other things, to get brilliant transparency of colour on some parts to contrast with the density of others, so that there are practically no limitations to handicap him. While on the subject of surface qualities, I would have you notice the additional merit of a plastic material. In terra-cotta, or any such material which necessitates a firing process, there is, unfortunately, very little assurance that the exact quality left on the clay by the modeller will be adequately retained after it leaves the kiln. This is not the case when using a plaster medium, as one can be absolutely certain of the exact reproduction of the clay surface, even to the impression of a thumb-print, in the finished cast.

I have explained before the method of colouring. Let me add that the plaster casts are edged and backed with strips of wood let into the cast, partly to prevent them from warping, and also for use in fixing, as these hold the screws which fix the panels in position. There is always a space left between the panel and the wall for ventilation, and we have found by trial that it is safer to leave the back of the plaster untouched, so that any damp may have free egress. The joints in large panels are stopped in thoroughly and treated with colour, so that they are practically invisible. There would never be any difficulty to remove the panels, if necessary, without damage to them, which would be practically impossible in the case of a fresco decoration. I may mention that when the whole work is fixed complete in its position it is carefully reconsidered with relation to its exact surroundings, and should it be found necessary to lower the tone or accentuate the brilliancy of any portion of the scheme, such alterations can be effected without the slightest difficulty.

There should, I think, be some special advantage derived in such work by collaboration of the painter and sculptor. I do not say it would not be possible to obtain even the best results from the hands of one man, be he either painter or sculptor; but I cannot help feeling that he would do that portion with which he is most familiar with much more feeling and verve than the other, where, through not possessing a thorough knowledge, he will, owing to his limitation, be timid and handicapped. There are, I imagine, essentials in every craft which only the practised professional really masters. Of course it is equally necessary in the case where two men collaborate that there should exist a great sympathy between them; but, given this, I think that each will exercise a wholesome restraint on the other beneficial to the work, while the joint imagination of two minds should instil a greater degree of interest.

One word in conclusion. The term "coloured relief," used commonly to distinguish the kind of work I have described, is, I think, rather misleading and inappropriate. For instance, it leads one to suppose that, above all, the intention of the artist was to produce a bas-relief, and that almost as an afterthought this completed relief has been coloured. I hardly imagine true success could be attained by work done under these conditions. One notices the same defective results when, as so often happens, poems which were never written to be sung are set to music. The verse and music may each be perfect in its way and similar in rhythm, yet the song will be imperfect for lack of original collaboration and unity of purpose.

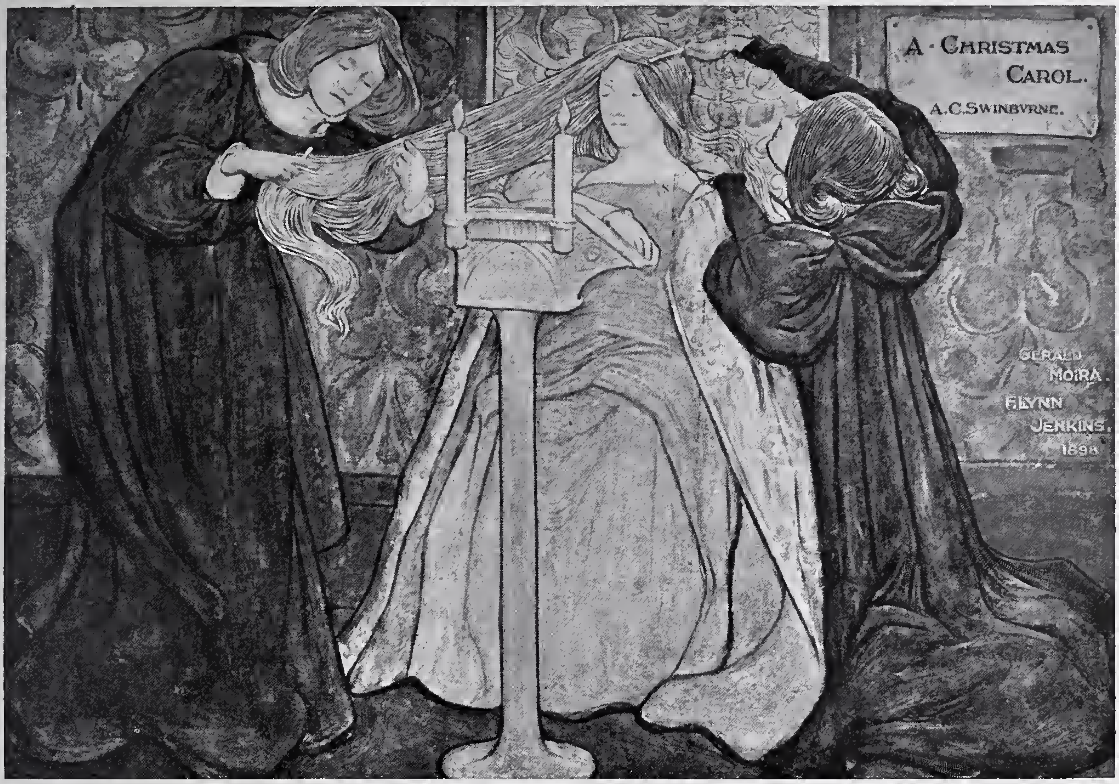

FIG. 10.—COLOURED PLASTER RELIEF BY GERALD MOIRA AND F. LYNN JENKINS.

No; the end of this form of art must be to produce in all sincerity a complete work dependent for its completeness on all its essential and component qualities—a relief yet not relief, a painting but more than a painting—each art used only to assist the other, and together forming a new and complete style. This is the aim we have in view, and if we have failed to realise it, we can honestly say it is not for lack of sincere purpose.

DISCUSSION OF THE FOREGOING PAPERS.

Mr. H. L. Florence, *Vice-President*, in the Chair.

Mr. J. M. BRYDON [*F.*] begged leave to move a very cordial vote of thanks to the readers of the Papers. The subject of colouring in the treatment of ornamental work in the interior of rooms must be more or less of a difficulty with all architects. There was no great difficulty in getting good reliefs, good friezes, good lunettes, and good sculpture, modelled in low relief, in plaster, surrounded by appropriate decoration, either in vaults, or flat ceilings, or friezes, or coves; but, after that was accomplished, they were confronted with the difficulty of colouring it, preserving it, and keeping it clean. Mr. Jenkins had told them that it was practically impossible to colour a sculptured frieze or panel in relief unless it had been designed with the idea of afterwards being coloured; and that, if possible, the two minds—namely, the sculptor and the painter—should work together. That was all very well; but architects were frequently called upon to treat actual reliefs in sculptures which had not been designed with this idea of collaboration. One matter the Art Committee had in view in suggesting this paper was how to treat a ceiling which had elaborate decorations in the way of sculptured panels or a frieze when it came to the actual decoration of the room. The beauty of sculpture to a certain extent becomes lost when the work is coloured. He must not be understood to say that it was impossible so to accommodate the colour as to retain the beauties peculiar to sculptured work; but they ran the risk of losing what is the great beauty of all sculpture—its delicacy of modelling, and the delicacy of light and shade that was to be got from modelled forms. Without going into the question of the forms themselves, he submitted that all sculpture, as applied to architecture, must be treated conventionally—there must be a certain severity of form and line, in order that they should steady themselves, so to speak. Wherever they approached the naturalesque shape, the merely modelled naturalesque figure, the difficulty was increased tenfold, both in the body and in the colour; for the simple reason that all those flowing lines were more or less in antagonism to the strict architectural lines of the building. Looking at the magnificent frieze of the Parthenon, it would be seen that the figures on it were conventional to a certain extent, and therefore in harmony with the severe Greek lines round them. The question for architects was this: what should they do with such a frieze as that of the Parthenon if they were asked to colour it? That question was presented to them nearly every day. They were frequently confronted with problems, not designed, unhappily, in collaboration, not meant from the first to be painted, but which they were asked to decorate somehow or other; and the question was, how should it be done? It seemed to him that some of the specimens submitted as illustrations were treated in a manner too restless for an architecturally decorated room, and that was what he meant when he said that all the lines must be more or less conventionalised. Looking at ancient buildings, many of them must have been struck with the magnificent effect got from the use of gold, especially in ornament, such as capitals, or the eggs and tongues and leaves of cornices, where no amount of colour could ever give the same effect as solidly gilding the whole lot. This suggested the application of gold to ornamental relief; instead of employing a multiplicity of colours, reducing them to very few, and keeping the figures more or less conventionalised, having them in gold, or one colour only, and the background in another. In that way the broad effect would be got which is the first result one seeks for in sculpture. The idea is to keep it very broad, very simple, very stately, very strong in its lines, not at all naturalesque, and not at all confused or jumbled up. Looking at some of the specimens exhibited, he could not help thinking that the ideal result had not yet been attained, nor did he think it had been quite indicated in the papers. It was interesting to hear of the actual production and the technical treatment of the plaster; but the difficulty seemed to be after it was all finished that the proper treatment should be very stately, very dignified, very broad, and at once lifted up above the ordinary decorative work to something very noble, such as could be seen in some of the old palaces in Italy.

Mr. HAROLD RATHBONE (Della Robbia Pottery, Birkenhead) said there was nothing more objectionable than the large masses of glazed coloured tilings, with a perfectly flat surface, though it seemed necessary now to get some material which would defy the dirt and smoke and retain its colour-quality and brilliance. The machine-made tilings of the chief manufacturers of the day were intolerable; and in order to make others with an interesting surface and broken colour the promise of support from the architects was an absolute essential. Permanency in material was also a necessity. It amounted to an insult (or at all events a vulgarity) to put a noble and historic design into a material such as coloured plaster, which was absolutely certain to suffer from the effects of time, although the surface of this material, so long as it lasted, and the variety and softness of colour which could be obtained, made it among the most attractive of all decorative settings for more temporary purposes. Very fine effects might be secured by the utilisation of simple material in combination with richer material—such, for instance, as large surfaces of Candy's glazed ivory bricks which were made in Devonshire, Van Stratten's green tiles, other tiles which were being made by Conrad Dressler at Medenham modelled on those used at the Alhambra, bands of plain colour, such as De Morgan's peacock-green tiles now supply, with accents and settings carried out in low relief work, or, if circumstances demand it, modelled in high and rich relief, with coloured grounds rendered in a permanent medium, after the manner of the works of the Della Robbia family made in the fifteenth century, on whose model his firm were endeavouring to work their factory at Birkenhead. All these methods were much more suited to this climate than marble, which so soon gets discoloured. Such glazed work, used in discreet conjunction with brick, produced in architecture the same delightful sensation which was felt in a lesser degree from the shine and shimmer of porcelain and glass on a material of a different nature, such as the every-day white tablecloth. This difference in texture, and the variety of charming architectural effects of colour and quality, could be obtained by adapting materials of even the same colouring but different textures, such as enamelled terra-cotta used in conjunction with ordinary red brick. Very beautiful permanent effects could also be produced by the use of mosaic, such as Rust's, amid a green or white tiling introduced as panels in a wall, with accents of rich modelled and glazed ware, telling as jewels of colour within these limits. Adopting this attitude, with the condition that the decorative settings of glazed ware thus introduced yielded the right perspective of architectural, or one might even term it orchestral, effect required for the building in question, depending mainly on the creamy or light silhouetted outlines and masses against the simple coloured grounds ; or, on the other hand, adopting the method of clearly mosaicked or patterned colour, there was little limit to the discriminative uses which the Della Robbian treatment, with colouring sympathetically adapted to our less sunless climate, could serve. The designs of leading sculptors working hand in hand with the architects, or simply the architects' own designs or suggestions, could be carefully and wisely interpreted to suit the potter's art, so as to insure the effect demanded by the architectural conditions. Nothing more telling could be used in this temperate sense for wall-fountains for the street or restaurant, reredoses, friezes, dado bands of colour, mantelpieces, memorial tablets, tympani for internal or external purposes, &c. ; and it had been his pleasure to carry out works on these lines and for each of the objects enumerated. This was an art which positively had not yet been seriously begun in this country, though the effects to be obtained were rich and delightful and sufficiently economical in comparison with other methods. The work of the Della Robbias was as fresh to-day as it was when it emerged from the oven 400 years ago; but out of many specimens of coloured plaster he (the speaker) had seen, the colour had sunk in and deteriorated sadly within the last ten years. If glazed ware were made use of in a constructive manner, it ought to be of the simplest nature, and in the main undecorated. The examples of modelled ware taken from moulds and dipped into coloured glaze led to the insinuation among them of a machine-made art which must needs be highly distasteful to their artistic sense for its treacly quality over monotonous flat surface, but if the simple material made large use of had an interesting and broken surface leading to a pleasant play of light, the effects of Venetian-like colour which could be got by judiciously introduced settings were infinite and delightful.

Mr. ED. W. MOUNTFORD [*F.*], in seconding the vote of thanks, said they were very much indebted to the readers of the Papers for the trouble they had taken, and for the very beautiful specimens they had brought before the meeting as illustrations. Of course every process had its drawbacks. The high glaze which Mr. Rathbone considered necessary to make his pottery permanent seemed a defect which would be better avoided. But, as he understood, if it were not for the glaze, the work would not be permanent, and in Mr. Rathbone's opinion the glaze and the permanence together were more desirable than by the omission of the glaze to lose the permanence. Some one near him observed that he should like to see a frieze of those brown-paper cartoons of Mr. Moira's, and he himself thought that it would be an admirable idea if a frieze could be carried out in something of the same tone as those cartoons. They certainly would give an effect of broad simplicity which in the more elaborately coloured models was lacking. All architects would agree with Mr. Brydon that considerable conventional treatment was desirable both in the modelling and in the colouring when such work was applied to architecture.

Mr. J. D. CRACE [*H.A.*] said that in the works of Luca della Robbia and of the great artists of the past, the first and primary idea was that the work should be clear when it was applied to architecture, and that the ground, whether lighter or darker than the relief itself, should be uniformly so, and not mixed up sometimes lighter and sometimes darker. As regards one or two specimens of friezes shown, whatever their artistic merits might be, their confused colour effect would certainly be unfortunate on architecture. There was a tendency to concentrate their attention far too much upon the technicalities of production, to the disregard of large treatment. That had been the misfortune of our greatest public building. Every possible attention had been devoted to the interest of the technical method adopted, but the bold and definite treatment of coloured line and expression of the building had been lost sight of. He always felt some regret when attention was devoted at the Institute more to the technical method, which was of comparatively second-rate interest, than to the greater subject of the definite expression of the surface and the line. The actual method of producing relief in fibrous plaster was not a new one, and the methods of colouring that had been described, so far as he could realise them, had been in use for the last thirty years; the methods of hardening plaster had been very well known for much longer than that. It was really a matter of finding the talent which should express, so far as sculpture was concerned, the forms which were agreeable and harmonious to the architecture, and, so far as the colouring was concerned, that method of colouring which would not only express the architecture, but should leave the form sufficiently defined to be recognised at the distance at which the architecture was to be seen.

The CHAIRMAN said there was no doubt that in our large and crowded cities a great deal more study should be given to the use of some sort of glazed material for the exterior of buildings. He thought that with a less violent and aggressive glazed surface there was ground for hope that in time a great improvement might be seen in our narrow streets and gloomy lines of houses. At present no broad view had been taken of a constructive material capable of being used in simple architectural form and with a dull glaze. With regard to the question of interior decoration, he had not been at all convinced by anything he had heard that evening that a glaze of any kind was likely to be successful, still less so if employed, as was generally the case, in panels. If a system of raised decoration be used, it should be in large masses, giving an effect not so much of a glaring or brilliant kind, except in special cases, as of rich reposeful surface. An attempt might be made to produce the effect of tapestry, something more quiet and homely. These brilliant panels, with coloured and sharp reliefs and contrasts, might be eminently well suited for restaurants, theatres, and places of public amusement; but, however beautiful they might be in themselves, he scarcely thought people would like to spend their lives surrounded by them. The subject was one on which great diversity of opinion might exist, as had been shown that evening, and he had hoped that, from the many Owen Jones Students sent out from the Institute, they would have heard some expression of opinion, and some result of their experience, during the discussion.

Mr. LANCHESTER, in responding, expressed himself as strongly in agreement with Mr. Brydon's observations as to the need for a severely conventional treatment of the frieze. The specimens exhibited were merely models about one-fourth the actual size. They were placed in a room the upper part of which was treated mostly with gold effect and the lower part with dark woodwork, and in no case could they be seen at a greater distance than their own length. They had arched treatment over them, and were not designed as supporting friezes.

Mr. LYNN JENKINS, in reference to Mr. Crace's remarks about the plaster, exhibited to the Meeting a piece of the material which had been roughly coated with a little colour, and, breaking it, showed that the colour penetrated at least an eighth of an inch into the plaster. This plaster was not produced on the old-fashioned method; it was a newly thought-out material with the special medium that they employed. So far as they could judge it ought to be durable, for they had placed it under water and used all sorts of methods of testing it, and the result had been satisfactory. In this process it was not necessary to have a glaze at all; an absolutely flat surface, with the tapestry effect, could be obtained.

NOTES, QUERIES, AND REPLIES.

Early Christian Churches in Palestine [p. 241].

From R. Phené Spiers, F.S.A. [*F.*]—

In continuation of my communication of the 6th March, it is unfortunate that so few remains exist of the churches erected in Jerusalem by Charlemagne in the ninth century and by the monks of Amalfi in the eleventh century, which might have enabled us to judge of the architectural development in Syria prior to the Crusades. In both these cases it is probable that native workmen were employed, who carried out the plans furnished to them, according to the customs of the country of which Mr. Dickie has given us a description; but whether the pointed vault as shown in Mr. Dickie's drawing was introduced from Amalfi or was current in the country there is no evidence to show. When, however, we come to the lofty vaulted churches which the Crusaders introduced it is impossible not to recognise that the work was not only set out but carried into execution by French and Italian master-masons, and masons' marks of both these countries are found; curiously enough, none are found of either English or German masons, though in some of the Crusading castles, and notably in the Castle of Belfort, there are early English mouldings. The nearest approach in design and style to the Crusaders' churches are those which are found in South Italy and Sicily; and, as the early Christian work in Sicily was built for the Normans by the native workmen with whom still rested the tradition of the Saracenic work of two and a half centuries (evidenced by the Zisa Palace and the Cappella Palatina, where perfect stalactitic vaulting and Saracenic ornament are found), it is probable that from Sicily may have been obtained a considerable portion of the labour utilised by the Crusaders in Syria. This is further suggested by the fact that at this epoch Arabic and Greek were the current languages in Sicily, so that they would be able to work in unison with the Armenian and other Christian workmen in Syria.

The two earliest Crusaders' churches in Syria are those of Byblos and Beyrout, and in both these cases the naves are covered with *pointed barrel vaults* with transverse ribs, identical with the vaults of the church at Carcassonne and other examples in Provence; and, as Carcassonne dates from 1096, whereas the two churches above mentioned are at least twenty years later, it is probable that they were erected by master-masons from the South of France and under the supervision of the monks of Cluny. De Voyue suggests that in these cases they had not attempted to utilise the labour of the country, which accounts for the introduction of this essentially French feature. They adopted, however, the triapsal arrangement for the east end with apses, circular inside and polygonal outside, of which so many Byzantine examples still exist.

At a later period, from 1140, the naves of the churches were vaulted with intersecting groined vaults and transverse ribs, the vaults all being built on regular centering with masonry of large dimensions, and always in horizontal courses and with a horizontal ridge. This is more Sicilian than French, and it might have been a local method except for the fact that very few of the earlier Byzantine churches, so far as I know, were ever vaulted. It is true that large numbers of those in Jerusalem were destroyed by the mad Khalif El-Hakim in 1010, but there are, perhaps, a dozen examples in Syria of which the plans are known, and in which the columns there shown could not have supported a vault. That the Crusaders were acquainted with these churches is evidenced by the fact that they adopted almost universally the triapsal design of the east end with polygonal exteriors to the apses. The ground plan of these churches consists of nave and aisles (which are nearly of the same width), of three or four bays, a transept with the groining covered by a dome or pendentives, and the triapsal east end.

The sectional outline and the construction of these domes with pendentives carried on pointed arches are derived from those built in the South of France, in Périgord and Angoumois, which I described in detail in my paper on Saint-Front and the Domed Churches of Périgord and the Charente,* and in which I drew attention to the fact that the pendentives were set out on the intrados of the arch, such as is not found in eastern domes, where they are always set out on the extrados.

The three examples from Fléac, Lanville, and Mouthiers [fig. 2], if compared with the dome and pendentive of the church of St. Anne at Jerusalem, will show the resemblance I refer to in the setting out. It becomes, therefore, a question of date, and, as those in France were developed from *the commencement of the eleventh century*, and the earliest Crusading domes in Syria are not placed earlier than *1140*, it follows that they were introduced by the French into that country. The chief dates of those in France are St. Stephen, Périgueux, west dome 1013, central dome 1030; St. Jean de Cole, about 1086; St. Avit Senieur, end of eleventh century; Fontevrault nave, 1101–19; Cahors, 1119; Angoulême west dome, 1120. The dates of Fléac, Lanville, and Mouthiers are not known, but they carry on the traditional method of building the pendentives. The return curve of the pendentive to which I referred in my paper on St. Front [p. 253, Vol. III.] is most clearly shown in the reproduction of the dome of St. Anne.

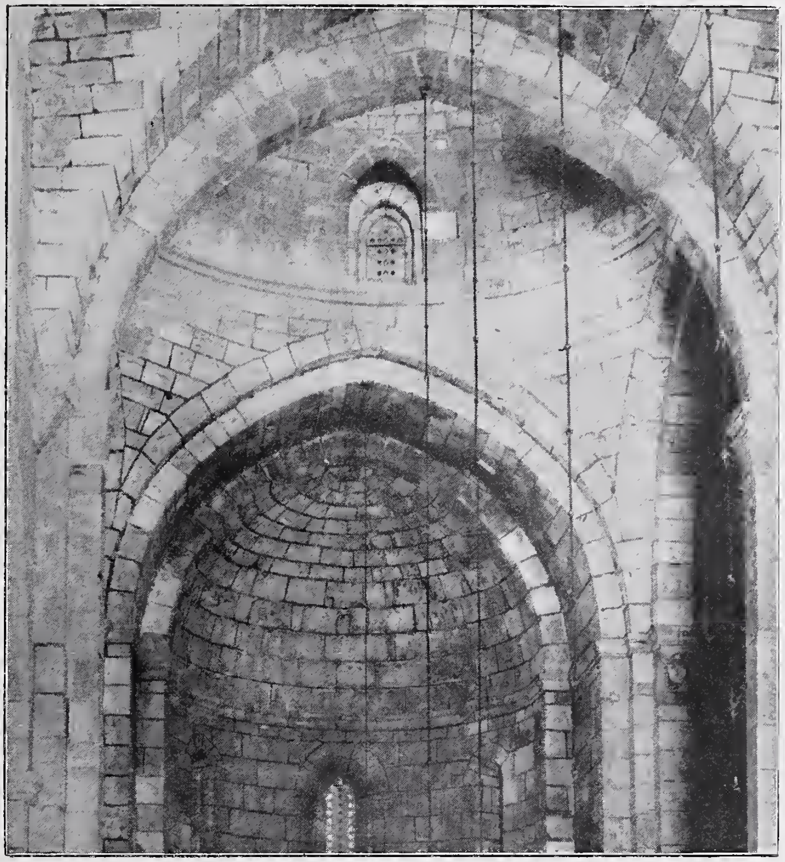
FIG. 1.—CHURCH OF ST. ANNE, JERUSALEM

The pendentives of these domes were all built in horizontal courses, and the cupolas above are all built on regular centering. This is not the Eastern method of building domes; the only example known in Syria is that of Ezra, a lofty conical dome built without centering (see De Voyue's *Syrie Centrale*, plate 21).

There are one or two other special characteristics in those Crusading churches.

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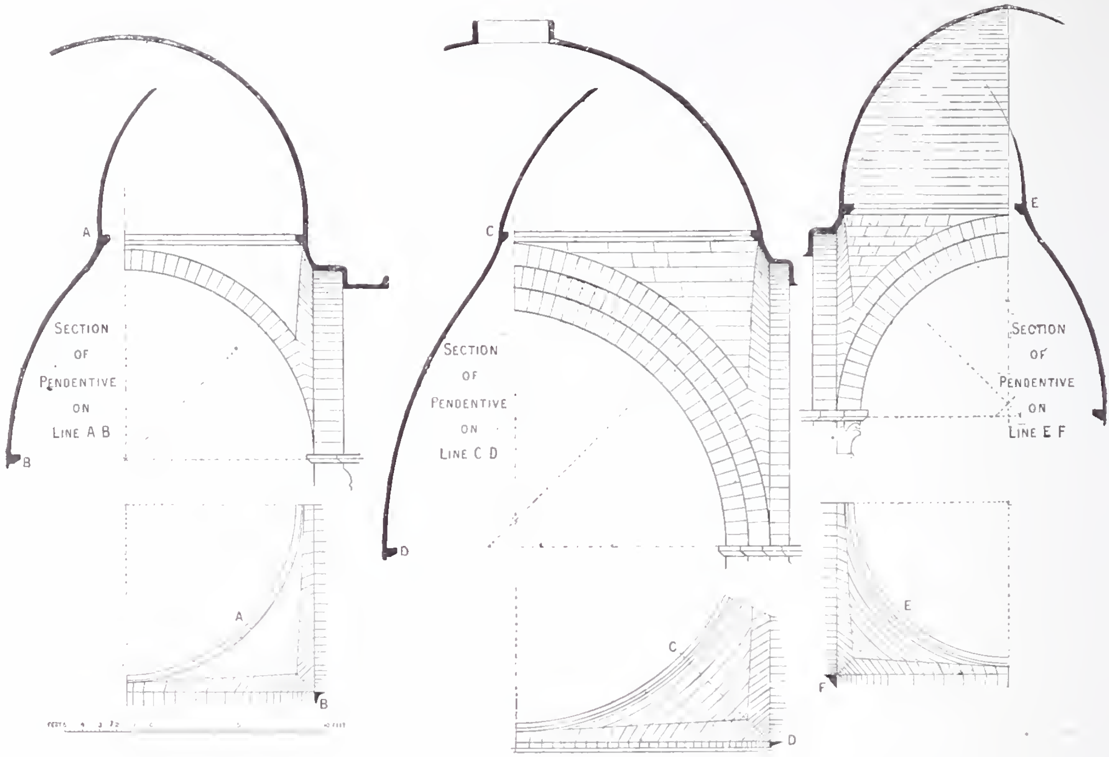
* JOURNAL, 1896, Vol. III. 3rd Series, p. 233.

1. The roofs are all flat, and covered with stone slabs or cement laid direct on the vault.

2. With two or three exceptions the arches are all pointed, and have a central keystone.

3. When in the nave arches there are two orders, the set-back of the inner order is very slight, and in the earlier examples the arches are not moulded.


Section of Pendentive on Line A B
A
B
Section of Pendentive on Line C D
C
D
Section of Pendentive on Line E F
E
F

Fléac. Lanville. Mouthiers.

THE CHARENTE PENDENTIVES. (From measurements by Mr. T. Garratt.)

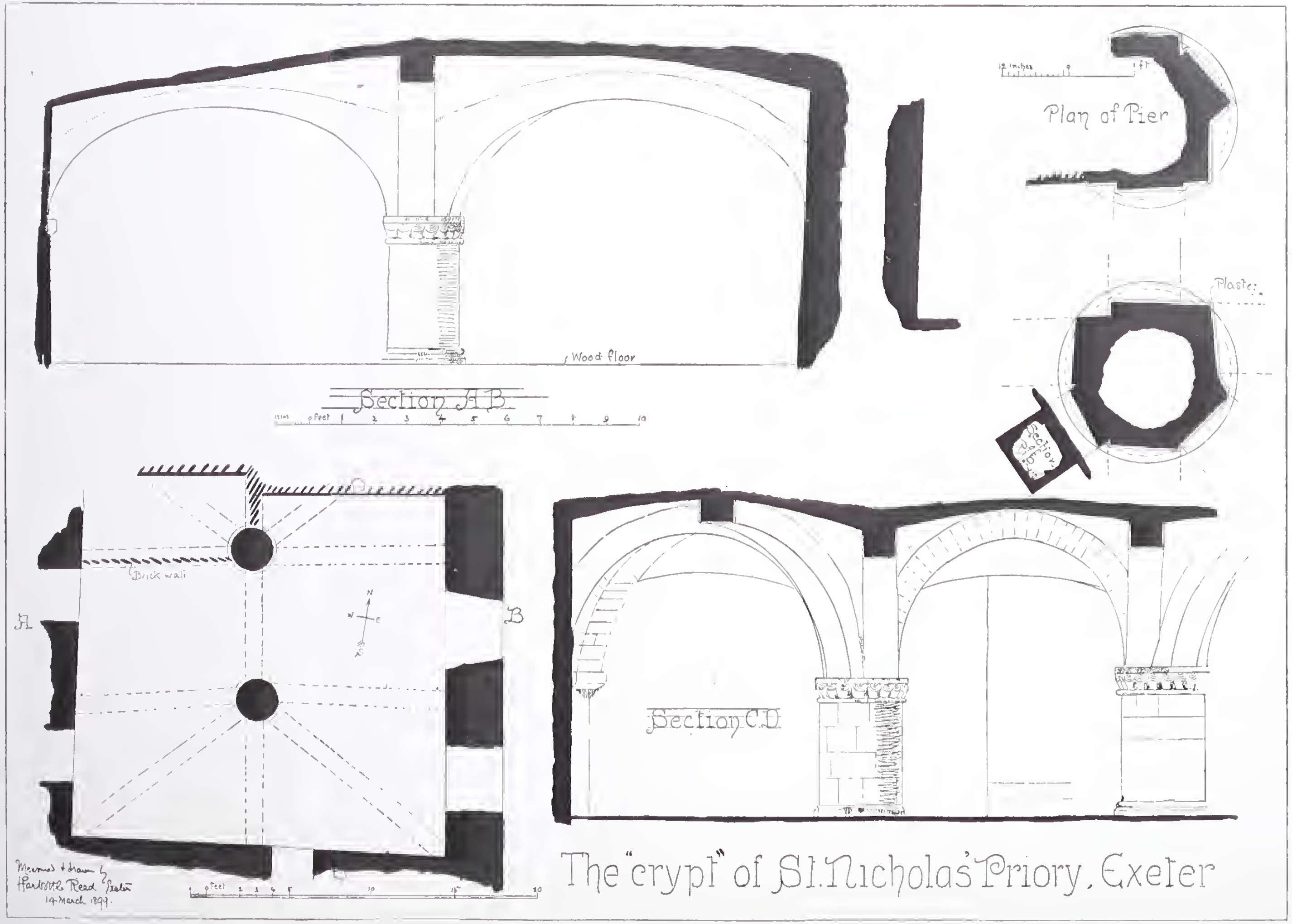
These two latter characteristics are in accord with the churches in Sicily built by the Normans at the end of the eleventh century and the first thirty years of the twelfth century.

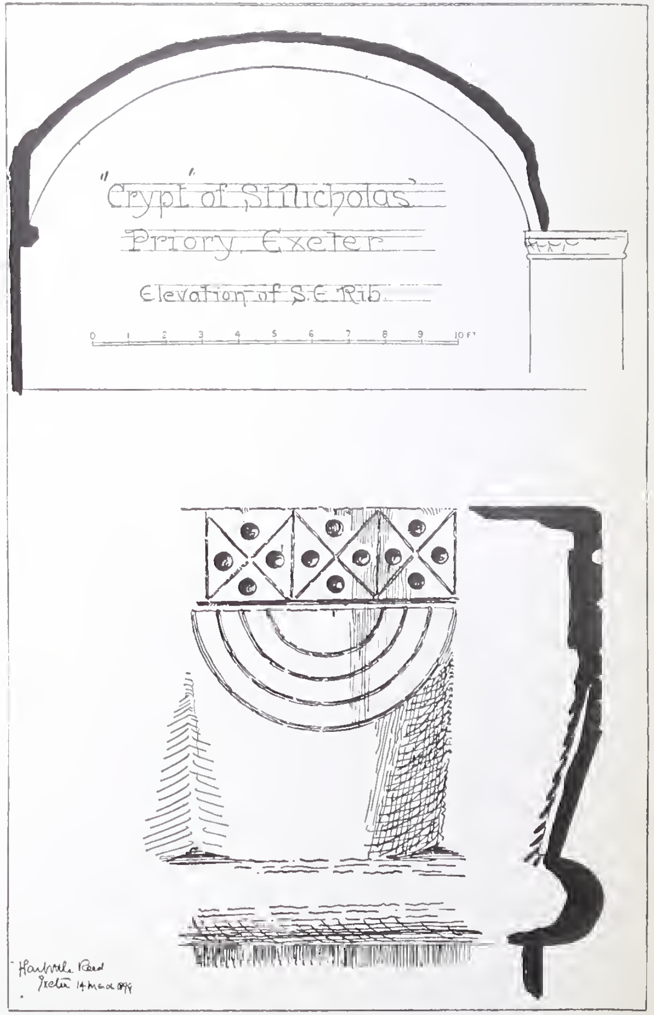
The features which are distinctly Syrian in character, viz. the polygonal apses and the flat roofs on the nave and aisles, are precisely those which were never introduced into Europe, while nearly all the others can be traced to French, Italian, Sicilian, or English sources.

There are, however, instances in which a distinctly Byzantine character is recognisable in the carving, much more marked than that which existed in France at the same period; and this is seen in the strongly developed hood-mould round the arches of the south front of the Holy Sepulchre and the continuation of this hood-mould as a string. On the other hand the cushion voussoirs of the two main portals of the south front, and the west portal of the Holy Sepulchre, and two or three other Crusading churches, were probably introduced from Sicily, where it is found in the town of the Martorana, dating from the commencement of the twelfth century. The other sculpture on the portals above mentioned is clearly French work, such as is found throughout Provence.

There is one other characteristic in the Crusaders' work, but chiefly confined to the castles, and that is in the diagonal dressing of the stone. As with the Herodian masonry, there is always a draft of three or four inches round the margin of each block; the dressing of the centre is done with a pick, vertically in Herodian work, and diagonally in Crusaders' work. The castle of Banias was always thought to have been Phœnician until Renan noticed the diagonal dressing.

THE EARLY UNDERCROFT OF ST. NICHOLAS' PRIORY, EXETER, LOCALLY KNOWN AS "THE CRYPT."





Professor Baldwin Brown, in his contribution to the discussion on Mr. John Bilson's Paper, "Norman Vaulting in England" [p. 324], cites this building as a very curious example of an early use of the diagonal rib. The drawings here reproduced were kindly made for the Journal by Mr. Harbottle Reed, of Exeter.

Norman Vaulting in England [p. 289].

From John Bilson [*F.*], F.S.A.—

In my reply at the close of the discussion on my paper, it was only possible to refer briefly to Mr. Bond's objections to the dates which I assigned to the high vaults of Durham Cathedral [p. 320 *ante*]. It may be well to deal with these objections a little more fully.

It appears to me that Mr. Bond's objections simply resolve themselves into this—that the possibility of the construction of such vaults at the beginning of the twelfth century is questionable, because it does not accord with the prevailing view as to the course of development of vaulted construction throughout Western Europe at the period in question. It would be impossible to discuss here the correctness of this view within reasonable limits. Examples from Burgundy, however, are scarcely relevant to the issue, unless it be admitted that Burgundy was then in advance of other districts, and such a view is certainly opposed to that now held by the best authorities. It has long been recognised that Viollet-le-Duc was not right in regarding the narthex of Vézelay as an important step in the development of the Gothic system.[*] Burgundy had accomplished great things at an earlier stage of the development, but in spite of this—or possibly for this very reason—it was not one of the districts which was the earliest to develop the ribbed groined vault. We must seek our analogies further west, in Normandy; for Normandy and England must at this time be considered as one province, architecturally as politically. I may quote in this connection a passage from Dehio and von Bezold, which is the more remarkable because they do not recognise Durham as one of the factors in the problem of covering the principal spans of our churches with stone vaults. They say: "The great architectural monuments of the eleventh century had not altogether solved this problem, but they had prepared for it in all its parts. And so, on the threshold of the following century, the Norman school was the first to attain this end, which had long been the common goal of all the north French schools" (*Die Kirchliche Baukunst*, i. 279).

Mr. Bond seems to think that the whole case with regard to the Durham vaults rests on a few words of a mediæval chronicler, and he suggests a conflict between the architectural and documentary evidence. If both kinds of evidence be properly sifted, there can be no conflict in the result, for (as Mr. Statham has well said) the basis of architectural evidence can primarily be obtained only from documents [p. 32 *ante*]. The documentary evidence here is contemporary, written on the spot, and there is no reason to doubt its accuracy. If the architectural evidence alone be considered, the sequence of these high vaults and their relation to the structure seem to be perfectly clear; the chroniclers simply enable us to date certain stages in the history of the work. The question really is—Are these high vaults the original covering of the church? My conclusion from architectural evidence alone is that they are, with the possible exception of the vault of the south transept, the existing choir vault being admittedly of the thirteenth century.

In the choir the whole design evinces in the clearest manner the intention to cover the principal span with the vaults of which traces are visible in the clerestory. If it be admitted that the ribbed vaulting of the choir aisles (where the bays are 23 feet 8 inches long) is original, is there really any serious difficulty in admitting the possibility of the construction of ribbed vaulting over the choir, which has a span of 32 feet 8 inches? especially when we know that within little more than a hundred years after its construction the vaulting was already in a ruinous condition. For we must remember that in a church completed some twenty years earlier—Saint-Nicolas, Caen—an aisled choir of 28 feet 6 inches span, with a clerestory, had been covered with unribbed vaults, and this is not the only surviving example of its kind. The original choir vault at Durham must almost certainly have been earlier than the vault of the north transept, because, though it was common enough to vault the choir alone and to

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[*] See *Viollet-le-Duc, ses travaux d'art et son système archéologique*, by Anthyme Saint-Paul (2nd ed., Paris, 1881), pp. 133, etc., and *Die Kirchliche Baukunst*, i. 410. In *Die Anfänge des gothischen Baustils* (in the passage mentioned on p. 267 *ante*) Herr Dehio says of Burgundy: "It is uncertain when groin-ribs first appeared; at any rate, their effect was not so revolutionary as in the districts of the North and West, with which we have hitherto been dealing" (p. 15). The following passage represents M. Lefèvre-Pontalis' opinion on the subject:—"En considérant le narthex de la Madeleine de Vézelay comme l'un des premiers édifices où la voûte à nervures avait fait son apparition, Viollet-le-Duc a commis une véritable erreur. Ce remarquable porche fut consacré, en 1132, à une époque où la croisée d'ogives était déjà d'un usage courant dans l'Ile-de-France, comme il nous sera facile de le démontrer. Les architectes bourguignons avaient si peu l'habitude d'appareiller des nervures, que les voûtes sur croisées d'ogives du chœur de Vézelay, élevé au commencement du xiii^{e} siècle, sont encore maçonnées avec du blocage noyé dans du mortier. Cette célèbre église n'a donc exercé aucune influence sur le développement de l'ogive, et les deux voûtes à nervures de son narthex sont une simple importation de la région parisienne. La Bourgogne fut une province retardataire qui s'assimila très lentement les principes du style gothique, et Viollet-le-Duc constate lui-même l'exactitude de cette observation (*Dict.* iv. 31). Les voûtes de la cathédrale de Sens, qui fut commencée vers 1140, sont une véritable exception, car à la même époque le maître de l'œuvre de la cathédrale d'Autun recouvrait encore une nef de grande dimension au moyen d'une voûte en berceau brisé." (*L'architecture religieuse de l'ancien diocèse de Soissons*, i. 63.) It is perhaps worth noting that, in different parts of his *Dictionnaire*, Viollet-le-Duc assigns to the narthex of Vézelay the dates 1160, 1130, 1135, 1130–1140.

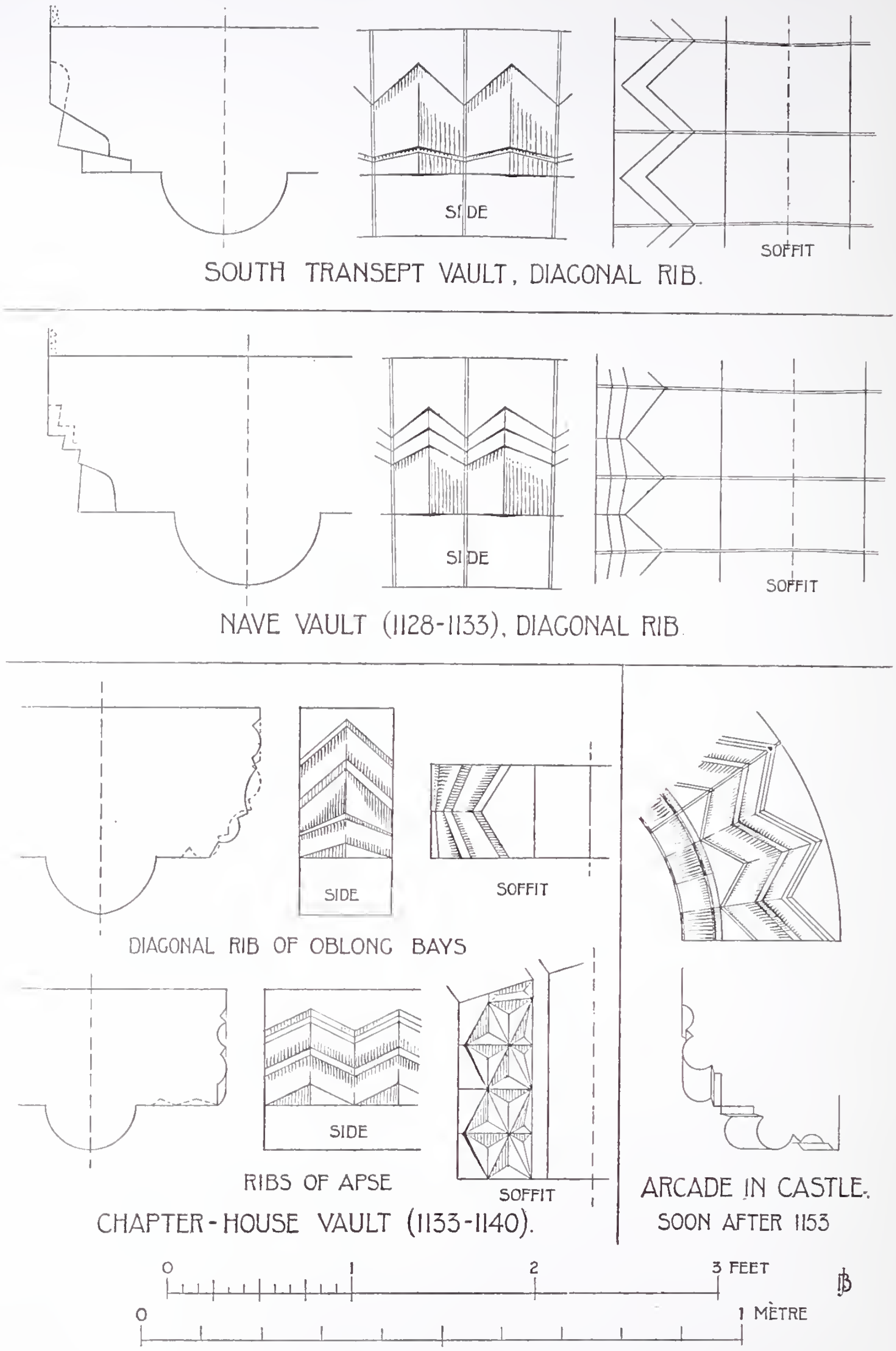
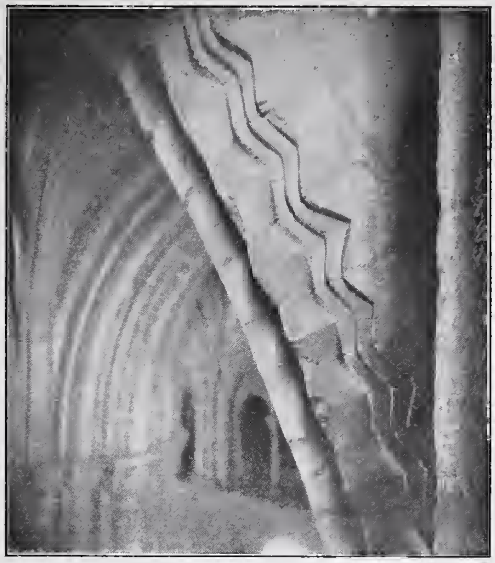

SIDE
SOFFIT
SOUTH TRANSEPT VAULT, DIAGONAL RIB.
SIDE
SOFFIT
NAVE VAULT (1128-1133), DIAGONAL RIB
SIDE
SOFFIT
DIAGONAL RIB OF OBLONG BAYS
SIDE
RIBS OF APSE
SOFFIT
CHAPTER-HOUSE VAULT (1133-1140).
ARCADE IN CASTLE.
SOON AFTER 1153
0
1
2
3 FEET
0
1 MÈTRE
JB

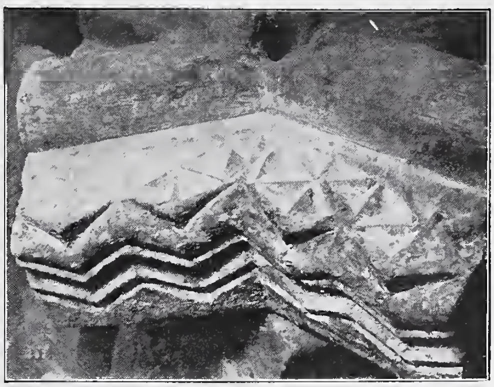
FIG. 30.—DETAILS FROM CATHEDRAL AND CASTLE, DURHAM.

cover the rest of the church with a wood ceiling, we can scarcely imagine that the usual procedure was here reversed. The design of the east side of the transepts shows the same intention to vault which characterises the choir. In the south transept, which would naturally be carried in advance of the north, because the cloister and conventual buildings were on the south side, the idea of vaulting was abandoned, and the clerestory constructed for a wood ceiling, perhaps actually so covered. At this stage of the work the intention appears to have been to abandon vaulting throughout the remainder of the church (north transept and nave) in favour of the more usual plan of wood ceilings for these parts.

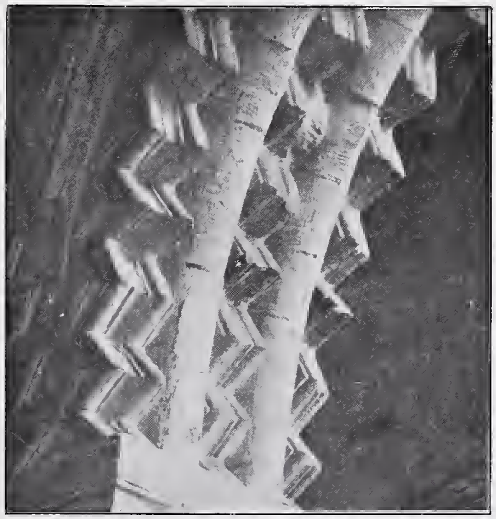
We have, however, abundant evidence that this abandonment can only have been temporary, and here the character of the details of the vaults demands attention. Differences of detail which would be of much less account if they occurred in separate works are far more significant when we find them in one group of buildings, the works of the same school of masons. When it became a question of covering the north transept, vaulting was constructed which corresponds in the character of its details with the earliest vaults in the church, those over the aisles of the choir and transepts, without any of the zigzag ornament so freely used throughout Flambard's nave. The vaulting of the south transept is a little later than that of the north, but the zigzag on its diagonal ribs is as simple in character as any in the church (see fig. 30), while the zigzag on the transverse arches of this vault is of the same pattern as that in the great arcades of Flambard's nave. A little later still comes the nave vault, with the pointed arch used in a curiously tentative fashion tending to confirm its early date; the zigzag on the diagonal ribs (see fig. 30, and the first photograph in fig. 31)* is still very simple, though a little less so than that on the ribs of the south transept vault. Finally we have the vaulting of the chapter-house, over a wider span than that of the nave itself, and, whatever may be the interpretation of the documentary evidence relating to the church, we have here a precise statement about which there can be no question—that the chapter-house was finished in the time of bishop Geoffrey Rufus (1133–40). Although its transverse arches were semicircular, the vaulting of the chapter-house followed the normal quadripartite plan, and not the half-developed form, without transverse rib in the centre of the double bay, which we find in the vaults of the transepts and nave. A comparison of the zigzag ornaments on the ribs of the chapter-house vaulting (fig. 30) with that on the ribs of the nave vault sufficiently indicates the earlier date of the latter. The zigzag on the diagonal



Diagonal Rib of Nave Vault, 1128- 133



Key of Apse Vault of Chapter-house (Bishop Geoffrey Rufus, 1133–1140).



Main Arcades of Galilee, *c.* 1175 (Bishop Hugh Pudsey).

FIG. 31.—DETAILS FROM DURHAM CATHEDRAL.

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* I am indebted to Professor Baldwin Brown for this photograph.

ribs of the oblong bays is similar in pattern to that on the diagonal ribs of the nave aisle vaults, but the detail here is more refined, and the soffit roll is slightly pointed in section. The zigzag on the ribs of the apse vault is a little more advanced in character than any in the nave.*

Another point of importance demonstrated by the evidence of the structure itself is that (except in the south transept) the clerestories are part of the same work as the vaults. In the choir this is sufficiently shown in the bay illustrated in my fig. 7 (p. 296 *ante*), where the clerestory window is not placed centrally over the triforium opening, but its position is evidently determined by the vault (see also Billings' *Durham Cathedral*, pl. xi). The clerestories of the nave fit the vaults so well that they can scarcely have been designed separately, but we have definite evidence which proves that they must be contemporary. This is most obvious in the second bay from the west end, a single oblong bay, where the tower pier on one side has an additional shaft which receives the diagonal rib on the west side of the vaulting bay; on the east side of the bay the rib springs from a corbel as usual. The triforium is placed centrally between the shafts; the vault is necessarily placed centrally between shaft on west side and corbel on east side, and is thus not central with the triforium and main arcade below (see Billings' *Durham Cathedral*, pl. x); the clerestory is not central with the triforium, but with the wall-cell of the vault, conclusively proving that clerestory and vault were designed together. In all the other bays of the nave (except perhaps the eastern half bay next the crossing) the vault is not placed centrally over the triforium, since the corbel from which the rib springs next the major pier is nearer to the centre line of triforium than the corbel over the minor pier; and in every case the clerestory is central with the vault, and not with the triforium. In the north transept we have similar evidence in the bay next the crossing, and in the northern bay (east side) the clerestory can only have been designed for the existing vault. In the nave clerestory (the latest) the character of the detail corresponds with the work below, and all the capitals are still simple cushions.

The only possible conclusion, then, as I think, is that the existing vaults of the north transept and nave of Durham are the original coverings of those parts of the church, contemporary with the clerestories. If, however, objection is still taken to this conclusion, I think we are entitled to ask for more than merely negative criticism. We need an analysis of the history of these vaults which harmonises with the architectural evidence, even if the documentary evidence be entirely disregarded. For the vaults of the transepts and nave are *there*, and have to be accounted for; and not only the vaults themselves, but also the clerestories, which (except in the south transept) are clearly contemporary with the vaults. Take the nave, for example: if *testudo* in the passage quoted (note §, p. 295 *ante*) means a wood roof or ceiling, either this must have been erected at the top of the triforium stage—in which case it is difficult to understand how the chronicler could describe the church as completed by 1133—or, if the nave was roofed or ceiled above the clerestory, then the whole clerestory must have been rebuilt when the vaults were added. The consequent reconstruction of the clerestories and the erection of vaults over a church nearly 400 feet in length would have been an operation of considerable magnitude, and yet not only have we no record of it in a case where the documentary history of the building is unusually complete, but the structure itself affords no evidence of such reconstruction; although in the south transept, where a wood ceiling was really contemplated when the clerestory was built, the evidence is clear enough. The only alternative suggestion which Mr. Bond has hitherto offered is that the high vaults were built in the time of bishop Hugh Pudsey, *c.* 1160.* No evidence is presented to support this suggestion, and it is emphatically contradicted by the character of this bishop's well-known works in the cathedral and castle at Durham, at Auckland, Sherburn, and Darlington. The zigzag illustrated in fig. 30 is taken from what is known as the "Norman Gallery" in Durham Castle, the earliest known of Pudsey's works, carried out in consequence of a fire which occurred very soon after he became bishop in 1153. The galilee of the cathedral (fig. 31)† is a later work of this bishop, dating probably about 1175. The architectural evidence afforded by these details will probably be sufficiently convincing on this point. It is, however, premature to discuss an alternative theory until a working hypothesis is suggested which will account for these vaults in harmony with the architectural evidence.

Mr. Bond raises the objection that these vaults were not at once copied elsewhere, so far as we know. I have already (p. 311 *ante*) made some suggestions which seem to me to meet this objection, and its force is much weakened when we consider how very few choirs erected in

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* The diagonal rib of the oblong bays (fig. 30) was measured from a loose voussoir found during the recent restoration, and many of the old voussoirs have been re-used in the new vaulting. The rib of apse vault (fig. 30) was measured from the original keystone (at A, fig. 28, p. 318 *ante*), which is still preserved. The centre photograph in fig. 31 illustrates this keystone. I am indebted to Mr. J. Freeman, verger of the cathedral, for this photograph, and also for that of zigzag ornament from the galilee.

* *English Cathedrals*, p. 56.

† For details of the arches in the galilee, see Billings' *Durham Cathedral*, pl. xxxv.

England during the first half of the twelfth century have survived without undergoing alterations or reconstructions, which make it impossible to say how they were originally covered. Vaults over naves and transepts are less to be expected, though the evidence of an intention to vault the main spans of Norwich, to which Mr. Hope called attention, is not only interesting in itself, but also as affording a striking parallel to the design of the choir of Durham. But Mr. Bond's objection appears to me to lose all force when the English vaults are considered in connection with Normandy, and they can only be treated as works of the same school. M. Anthyme Saint-Paul (*La Transition*, cap. vi.) is inclined to think that Evreux Cathedral had ribbed high vaults before 1130. There are the undoubtedly early vaults of Lessay, and later such examples as the transept of Montivilliers, representing an earlier stage of development than the notable group in and around Caen.

With regard to Mr. Wonnacott's note, it would be interesting if he would tell us where he finds in England, within the period in question, groins of unribbed vaults constructed in ashlar. I do not plead guilty to what he calls a slight slip of mine as to solid springers, for I venture to think that the meaning of the note to which he refers (note †, p. 304 *ante*) is quite clear, especially if fig. 16 be compared with Viollet-le-Duc's drawing there mentioned. The solid springer stone here referred to has, of course, nothing whatever to do with the construction of the springing of unribbed groins in ashlar work. In Mr. Wonnacott's table, the entry referring to Lincoln under 1092 is evidently a mistake; the vaulting of the nave was the work of Alexander, not Remigius (see note ‡, p. 316 *ante*). At Morienval some of the arcade arches of the ambulatory are pointed, and at Cambronne both the arcade arches and transverse arches are pointed. If any examples from the Ile-de-France find a place in such a table, several important buildings should be included, in addition to the two or three I happened to mention. With still better reason the numerous examples from Normandy might be included. Although Mr. Wonnacott has paid me the compliment of copying in his table most of the dates mentioned in my paper, I ought to point out that many of the dates are merely approximate (including several to which *circa* is not prefixed in the table), and this fact considerably detracts from whatever value such a table may be supposed to possess. I must confess to some doubt whether such tables have any value for the student beyond that of a mere index, and this doubt is confirmed when I find that the compilation of the table has not convinced Mr. Wonnacott of so much as the truth of the somewhat elementary proposition—that in the development of ribbed vaulting the quadripartite form must have preceded the sexpartite.

INCORP. 1837 1887

9, Conduit Street, London, W., 15*th April* 1899.

CHRONICLE.

The London Government Bill.

The following letter has been addressed to the First Lord of the Treasury:

28*th March* 1899.

To the Right Hon. A. J. Balfour, M.P.,
First Lord of the Treasury.

Sir,—The Council of the Royal Institute of British Architects, viewing with some apprehension certain clauses in the London Government Bill which affect the architectural profession, desire most respectfully to draw your attention to various points set out below, of which they would urge your earnest consideration. In the first place, however, they would point out that the Royal Institute is the statutory body for the examination of District Surveyors, and that the Metropolitan Fellows, all practising architects, number 295, whilst further there are 545 Associates, all engaged in the work of designing and building in London, many of these being principals.

On behalf, therefore, of a responsible and representative body, the Council of the Royal Institute most strongly urge:

1. That architects practising in London on behalf of their clients, the public, would have great difficulty in complying with the By-laws made by forty different Borough Corporations, and that wide differences in the administration of any building laws must ensue where there is not one responsible head as at present.

2. That it is of the utmost importance for the proper carrying out of the Building Act that District Surveyors should be independent Surveyors, responsible only to a central authority, and not merely officials of a single Corporation and therefore subject to local control. And, further, that the supervision of buildings should continue with them, and not be deputed to Building Inspectors under the control of a Borough Surveyor or Engineer.

3. That architects, having to submit their drawings for important and public buildings to the District Surveyors, strongly object to subject

themselves to the direction of anyone who is not a qualified and experienced architect, and independent of all local influences.

4. That the administration of the London Building Act 1894 having worked well for so many years, there is no reason for any alteration. For such a purpose London must be treated as a whole, and therefore the rules applying to the other Town Corporations, which are quite apart from, and independent of, each other, cannot apply to these London Corporations, which are merely parts of a huge Metropolis.

5. That for the above reasons Clause 6 of the Bill be entirely omitted, and the powers under Clause 5 be strictly limited to matters which are local and not general.

6. That architects acting for their clients, the public, already labour under great difficulties in consequence of the very varied character of the Sanitary and other By-laws at present issued and enforced by the Local Authorities in the London area, and that the London County Council, as the central authority, be empowered to issue to each proposed Corporation By-laws as to sanitary and other matters affecting buildings which shall be compulsory throughout the whole London area.

7. That no further splitting up of the laws affecting buildings in the Metropolis be allowed, but that rather all these be made uniform throughout the whole area affected by the Bill.

We have the honour to be, Sir,
Your most obedient Servants,
(*Signed*) { Wm. Emerson, *Hon. Secretary.*
{ W. J. Locke, *Secretary.*

Presidents of Allied Societies elected Fellows.

The following gentlemen, being Presidents of Allied Societies, who had applied for and been found eligible for admission to the Royal Institute, were elected to the Fellowship, under the proviso to By-law 9, at the Council Meetings of the 27th ult. and 10th inst. respectively :—

William Glover, of 16 Market Street, Newcastle-on-Tyne, President of the Northern Architectural Association, elected on the 27th ult.

Joseph Smith, of St. Peter's Chambers, 1 Hartshead, Sheffield, President Elect of the Sheffield Society of Architects, elected on the 10th inst.

The Brickwork Experiments.

Mr. Max Clarke [*A.*] requests the publication of the following correspondence :—

4 *Queen Square, W.C.* : 23*rd March* 1899.

Sir,—On page 283 of the Journal (11th March 1899) the President is reported to have made the following statement :—"The Council had given Mr. Max Clarke full permission to publish the conclusions arrived at," &c.

As I do not consider the letter from the Council to me *did* give full permission, I shall be obliged by your inserting this letter, and also the Council's letter to me and my reply (copies of which I enclose), in the next number of the Journal.—Yours faithfully, Max Clarke.

The Secretary R.I.B.A.

7*th June* 1898.

Dear Sir,—In reply to your letter of the 31st May, I am desired by the Council to inform you that they will have much pleasure in surrendering to you the copyright of the three papers on brickwork tests published in the Journal, and to give you whatever assistance they can, on condition that the Institute is not mentioned in connection with the experiments, and that you allow them to see the proof of the book before publication.—I am, dear Sir, yours faithfully,

Max Clarke, Esq. W. J. Locke, *Secretary.*

4 *Queen Square, W.C.* : 30*th September* 1898.

Dear Sir,—In reply to your letter of 7th June on this subject, as it is not possible to publish any account of the brickwork tests without mentioning the Institute, the conditions suggested by the Council prevent my proceeding further with the matter.—Yours faithfully,

The Secretary R.I.B.A. Max Clarke.

The late Edmond Egan [*A.*].

Mr. Edmond Egan, who died on the 3rd inst., was born at Killarney, Ireland, in 1840. He was elected Associate of the Institute in 1881. Leading an exceedingly busy life, he designed and executed a large number of private houses, laid out several estates, and carried out various schemes for the disposal of sewage. Settling in Loughton, Essex, in 1871, he confined his practice to the locality. Among the buildings erected by him were the Loughton Public Hall, Buch Hall, Theydon Bois, "Brooklyn," "The Hermitage," &c., at Loughton. He carried out the drainage schemes for Chingford, Loughton, and Theydon parishes, and laid out the Habgood, Forest Side, and Buckhurst Hill Park Estates.

REVIEWS.

WELLS CATHEDRAL.

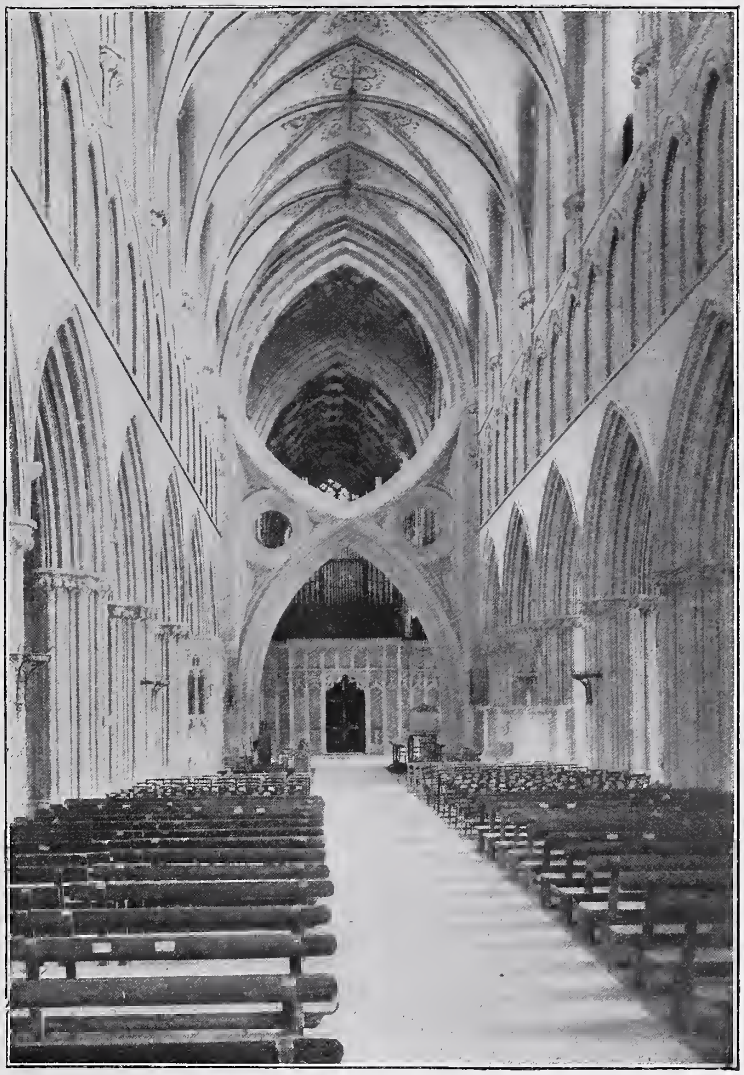
The Cathedral Church of Wells. A Description of its Fabric and a brief History of the Episcopal See. By the Rev. Percy Dearmer, M.A. 8o. *London*, 1898. *Price* 1s. 6*d.* [*Messrs. George Bell & Sons, York Street, Covent Garden, W.C.*]

Many books have been written about Wells and its Cathedral. So late as 1897 a scholarly handbook, bearing the name of the Rev. Canon Church and illustrated by Herbert Railton, was issued by Messrs. Isbister; and now we have the Wells volume of Messrs. Bell's well-known series. But the latter comprehends within its compass of 158 pages not only what would be strictly comprised within the above title, but a compact account of the Bishop's Palace, the Deanery, the Archdeaconry, the unique Vicar's Close, and of other buildings subsidiary to the Cathedral, which render Wells probably the most complete specimen in existence of an establishment of secular canons as distinct from a monastic one. Short descriptions are also given of the (only) Parish Church, St. Cuthbert's, having one of the best specimens of a "Somerset Tower," and of Bubwith's Hospital; and the concluding chapter has compressed into its eleven pages a "History of the Diocese," curtailed, as the author explains in his preface, by necessary considerations of space.

Wells is one of our smaller Cathedrals, the extreme length from east to west being 385 feet, and the breadth of the transepts 135 feet. It takes rank with Exeter as a church, but is far superior to it in its surroundings. The original Saxon and subsequent Norman churches have for all practical purposes disappeared. The font is, however, of early date and not improbably pre-Norman. The existing buildings range from First Pointed of an early character right through the Decorated and Perpendicular periods.

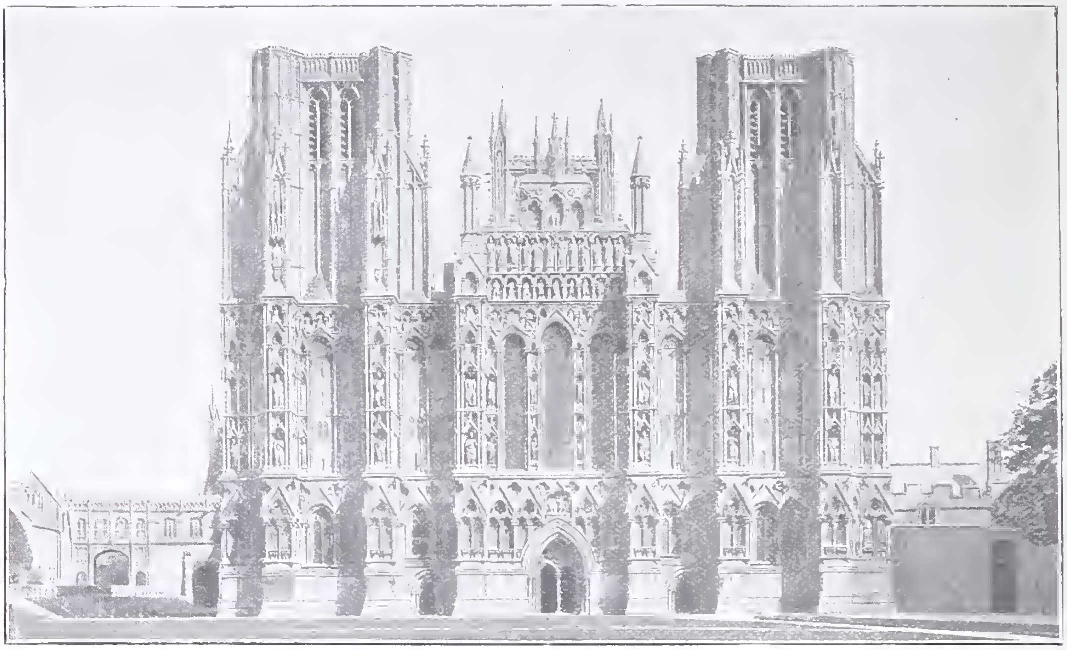
The great feature of the Cathedral Church itself is, by general consent, notwithstanding the very strong criticism of Professor Freeman, the west front [p. 352]. This forms a large screen, as at Lincoln, masking the western termination of the nave and aisles; but, unlike Lincoln, this screen is flanked by two (very similar) towers, and presents an almost complete architectural design. The author's suggestion (p. 25) that "the front of Wells may stand, like the reredos of Winchester, as the noblest example of its kind," is well justified. Some ten pages are occupied with a detailed and, after as careful an examination as can be possible from the ground level, the reviewer would say, a very accurate account of the wonderful series of statues. The weak feature of "the slate pencils," the Kilkenny marble shafts taking the place of the originals of blue lias, is greatly to be deplored.

The special feature of the interior is the inverted arches in the crossing, constructed about 1321 to strengthen the central tower after the erection of the upper stages. As a piece of building construction they are admirable, as is proved by their still proving effectual after the lapse of so many centuries; while from an architectural point of view the effect is, to say the least, not unpleasing.



THE NAVE. (From a photo. by Messrs. Dawkes and Partridge.)

The author has devoted some pages to a very carefully detailed description of the north porch (about 1185), of which he speaks (p. 48) as "perhaps the finest piece of architecture at Wells;" and subsequently, "nothing could well surpass the interior of this porch; the delicacy and refinement which are shown in every detail are the more amazing when we consider that the architect and his masons had only just emerged from the large methods of Norman building."



THE WEST FRONT. (From a photo. by Messrs. Dawkes and Partridge.)

The illustrations, forty-six in number, are generally good; some, of details, particularly so. There is a ground plan, brought up to date so as to include the foundations east of the cloister. This is the better for not attempting to show too much in the way of detail, or of detailed description.

The author has made good use of the materials at his disposal and of the assistance received from others—all duly acknowledged both by himself and the editors of the series. But this has evidently been carefully supplemented by personal examination and inquiry.

We cannot agree with the author's criticism on the altar tomb and effigy of the late bishop, Lord Arthur Hervey: "It may be hoped that it is the last of its kind, since there is little room for more tombs, and great need of other and more useful forms of memorial" (p. 126). The former reason should, of course, have due weight, but we have little sympathy with the strictly utilitarian school, who would supply the necessities of the day under the pretence of a testimony of respect to a venerated bishop. "These ought ye to have done, and not left the other undone"!

There is a "Table of Contents" and a "List of Illustrations"—no Index. It has taken the writer just a quarter of an hour to discover the allusion to Bishop Hervey which he had previously noticed.

James R. Bramble, F.S.A.

MINUTES XI

At the Eleventh General Meeting (Ordinary) of the Session 1898–99, held Monday, 10th April 1899, at 8 p.m., Mr. H. L. Florence, *Vice-President*, in the Chair, with 20 Fellows (including 8 members of the Council), 18 Associates, 3 Hon. Associates, and several visitors, the Minutes of the Meeting held 20th March 1899 [p. 328] were taken as read and signed as correct.

The decease was announced of Edmond Egan, *Associate*.

Papers were read on The Application of Colour to Interior Ornament in Relief by Messrs. H. Vaughan Lanchester [*A.*] and F. Lynn Jenkins, and, having been discussed, a vote of thanks was passed to the authors by acclamation. The thanks of the Meeting were also accorded the gentlemen who had kindly lent specimens of their work in illustration of the subject.

The proceedings then closed, and the Meeting separated at 10 p.m.

REPORT OF THE COUNCIL FOR THE OFFICIAL YEAR 1898–99.

Approved and adopted by the Annual General Meeting, Monday, 1st May 1899.

SINCE the publication of the last Annual Report, on the 7th May 1898, 20 meetings of the Council have been held, of which the Council elected on the 6th June 1898 have held 17. These are exclusive of meetings held by Committees of Council.

In the course of the year 26 Fellows have been elected, 31 Associates, 1 Hon. Fellow, 1 Hon. Associate, and 1 Hon. Corr. Member. Of the 26 Fellows, 12 have been elected by the Council under the new proviso to By-law 9, 7 being Presidents of Allied Societies, and 5 having been unanimously recommended by the Councils of Allied Societies. The numbers in each class of subscribing members stand as follows: Fellows, 613; Associates, 1,003; Hon. Associates, 47.

The only gentleman elected as Hon. Corr. Member is the Professor Felice Barnabei (Rome).

The losses by death to the Institute during the past year have been as follows:—*Fellows:* Henry Bridgford, Henry Hewett Bridgman, Thomas Lainson, Professor Thomas Hayter Lewis, Thomas Rowe, John Gibbons Sankey, Sydney Stent. *Associates:* Hayward Richardson Brakspear, Edmond Egan, Sidney Alexander Ell, Charles Emanuel Evans, John Gillett Livesay, Frederick Mew, George Macfie Poole, William Reddall, Tom Turner. *Hon. Associates:* Sir John Fowler, Major Alfred Heales, George Andrew Spottiswoode, Judge Meadows White. *Hon. Fellow:* Sir Henry William Peek. *Retired Fellow:* James Murray. *Hon. Corr. Members:* Charles Garnier (Paris), J. von Egle (Stuttgart).

In Professor T. Hayter Lewis the Council mourn an old and distinguished member. A special memoir of his life will be found in the current volume of the JOURNAL, p. 126. A serious loss to European architecture is that of Charles Garnier, a Royal Gold Medallist of the Institute. The Council have subscribed to the monument now being erected in Paris to his memory.

Preliminary and Intermediate Examinations were held in June and November 1898 in London, Birmingham, Bristol, Manchester, and York, and Final Examinations in London. The results are shown in the following tabulated forms:—

PRELIMINARY EXAMINATION.

	Exempted	Examined	Passed	Relegated
Summer	40	92	58	34
Autumn	52	78	46	32
Total	92	170	104	66

INTERMEDIATE EXAMINATION.

	Examined	Passed	Relegated
Summer	76	53	23
Autumn	48	32	16
Total	124	85	39

FINAL AND SPECIAL EXAMINATIONS.

	Examined	Passed	Relegated
Summer	30	15	15
Autumn	33	16	17
Total	63	31	32

It will be seen that during the year 196 gentlemen have been registered as *Probationers*, the number of whom now stands at 1,098; and 85 as *Students*, the number of whom now stands at 303.

The Arthur Cates Prizes, for the best sets of Testimonies of Study (supplemented by certain specified sheets of drawings) submitted by Students for admission to the Final Examination, have been awarded to Mr. Albert Herbert for the June Examination, and to Mr. H. Inigo Triggs for the November Examination.

The Ashpitel Prize has not been awarded this year.

The Council desire to express their thanks to the Allied Societies of Birmingham, Bristol, Manchester, and York for their help in conducting examinations at those centres during the year.

The Council have again to express their cordial thanks to the Board of Examiners for their gratuitous services.

The Royal Gold Medal for the promotion of architecture was awarded last year to Professor George Aitchison, R.A., for his works as an architect and architectural writer. Her Majesty has graciously signified her approval that it shall be awarded this year to Mr. G. F. Bodley, A.R.A., for his executed works as an architect.

The Deed of Award of the various Prizes and Studentships was presented to the Institute at a General Meeting on the 16th January. After the distribution of the Prizes on the 23rd January a critical appreciation of the work submitted was read by Mr. Beresford Pite [*F.*]. An exhibition of the drawings was held in the rooms on the second floor from the 13th to the 23rd January inclusive. Owing to insufficiency of space in the Institute premises for adequate exhibition of the Prize Drawings, the Council desire to announce that arrangements have been made with the authorities of the Alpine Club, Savile Row, for the use of their hall during the month of January next.

The following selection from the Institute Prize Drawings is now being sent round for exhibition at the various allied centres:—Measured drawings of St. Paul's Cathedral, North Porch, by Mr. H. E. Kirby (*Institute Silver Medallist*); St. Catharine's College, Cambridge, by Mr. Heaton Comyn (awarded Medal of Merit and Five Guineas): Southwold Church, by Mr. Edward F. Knight (awarded Medal of Merit and Five Guineas). Design for a Concert Hall, by Mr. William Arthur Mellon (*Soane Medallist*). Drawings and Sketches by Mr. J. Hervey Rutherford (*Pugin Student*). Drawings by Mr. E. H. Bennett (awarded Medal of Merit and Ten Guineas); by Mr. Ramsay Traquair (awarded Medal of Merit and Five Guineas); and by Mr. Albert Herbert (awarded Honourable Mention). Designs for a Royal Mausoleum, by Mr. James B. Fulton (*Tite Prizeman*), by Mr. Alex. McInnes Gardner (awarded Medal of Merit and Five Guineas), and by Mr. Ernest T. Jago (awarded Honourable Mention). Colour drawings by Mr. James Stewart (*Owen Jones Student*). Design for a Fruit, Flower, and

Vegetable Market, by Mr. G. Gardner Wallace (*Grissell Medallist*). Testimonies of Study for the Final Examination by Mr. Albert Herbert and Mr. H. Inigo Triggs (*Cates Prizemen*), and by Mr. Henry Tanner, jun. (*Extra Prizeman*), and for the Intermediate by Mr. Lionel Upperton Grace, Mr. Thomas Frank Green, and Mr. Thomas Joseph Byrne.

The Royal Institute Annual Dinner was held on the 9th December at the Queen's Hotel, Birmingham. Among the guests of the Institute and of the Birmingham Association were the Lord Mayor and Deputy Lord Mayor of Birmingham, Sir Benjamin Stone, M.P., Sir James Sawyer, Mr. J. Powell Williams, M.P., Mr. William Kenrick, M.P., and Mr. J. T. Middlemore. In the regrettable absence of the President, the chair was taken by Mr. H. L. Florence, *Vice-President.* The dinner was preceded by a Conversazione and a General Meeting at the rooms of the Society of Arts. The Council desire to express their recognition of the hearty co-operation of the Birmingham Architectural Association, to which the success of the gathering was largely due.

The Annual Dinner this year will be held on Tuesday, 27th June, in London, at the Whitehall Rooms, Hôtel Métropole.

The sanction of the Privy Council to the alterations in By-laws 9, 15, 30, and 31 was given at the Council Chamber, Whitehall, on the 19th May. A copy of the official document forwarded to the Institute is printed in the Journal, Vol. V. p. 401.

The revised schedule of professional charges, entitled "The Professional Practice as to the Charges of Architects," was finally agreed upon and adopted at a Special General Meeting of the Institute held on the 27th June.

Since the issue of the last Annual Report the Aberdeen Society of Architects has been admitted to alliance with the Royal Institute.

The Council have taken public action with regard to the New Vauxhall Bridge and the London Government Bill.

The Council, having been requested by the Government to recommend a limited number of architects from whom two might be selected to prepare designs for the New Government Buildings, have been officially thanked for their services, and informed that Mr. J. M. Brydon [*F.*] and Mr. William Young [*F.*] are the architects chosen.

The Competitions Committee have had several meetings, and action has been taken with regard to the following competitions:—International Fisheries Exhibition, Aberdeen; Glasgow International Exhibition; Royal Institution, Liverpool; Tavistock Road, Plymouth; Fire Station, Bradford; Wolverhampton Workhouse; Godalming Municipal Buildings; Swindon Union Workhouse extension; Grammar School House, Doncaster; Wandsworth and Clapham Union.

Special Committees of the Institute are at present sitting to consider respectively the following subjects: the holding of the Institute Examinations in the Colonies; proposals by the Association of Technical Institutions that certain certificates of the Science and Art Department should exempt from portions of the Preliminary and Intermediate Examinations; the administration of Building By-laws in rural districts.

The portrait of Mr. F. C. Penrose, F.R.S. (*Past President*), painted by Mr. John S. Sargent, R.A., came into the possession of the Institute in August last, after having been exhibited in the Royal Academy.

At the request of the Court of Common Council of the City of London, the Council have nominated six architects to send in designs for the new Sessions House, Old Bailey.

The Council are pleased to announce that since the 31st December they have been enabled to invest £1,500 in Tasmanian Government 3½ per cent. stock.

REPORT OF THE ART STANDING COMMITTEE.

The Art Standing Committee report that they have held seven meetings since the publication of the last report. Mr. Alfred Waterhouse, R.A., LL.D., was re-elected Chairman; Mr. Macvicar Anderson, Vice-Chairman; and Messrs. E. W. Mountford and Owen Fleming were reappointed Hon. Secretaries.

St. Patrick's Cathedral, Dublin.—Plans and particulars of proposed additions to St. Patrick's Cathedral, Dublin, were submitted to your Committee, who were asked to state: (*a*) Whether the addition of modern building to the Cathedral was legitimate and reasonable; (*b*) whether the plan submitted was sufficiently conservative and considerate towards the original plan of the thirteenth century. Your Committee (*a*) determined that, assuming additional accommodation to be necessary for the efficient performance of the services of the Cathedral, it would be legitimate and reasonable to provide it; but (*b*) suggested a modification in the proposed grouping of the buildings.

Kew Bridge.—Your Committee, having had this matter under their consideration, urgently recommended the adoption of granite or stone as the material for the bridge, and, by the instructions of the Council, the Secretary wrote to the County Councils of Middlesex and Surrey conveying this recommendation. In reply the Institute was informed that stone would be used.

Vauxhall Bridge.—This subject has received further consideration, and, as the result of some correspondence between the Secretary of the Institute and the Chairman of the London County Council, the Chairman (Mr. Waterhouse, R.A.), with Messrs. Statham and Mountford (Hon. Secretary), waited upon the Chairman of the London County Council and stated their views as to the design prepared by Sir Alexander Binnie.

Historic Buildings in London.—At the invitation of the London County Council your Committee invited Messrs. Brydon, Mountford, and Young to represent the Institute at a Conference held by the Council. The Conference determined to prepare a register of all buildings of architectural or historic interest in the County of London, and a Committee was appointed, of which the Hon. Secretary of the Committee is a member.

Florentine Monuments.—The attention of your Committee having been directed to extensive alterations that appeared to be contemplated in the ancient quarters of Florence, steps were taken to assist the English Committee who had been appointed to deal with this matter. Signatures were obtained from members of the Institute and its Allied Societies to a memorial of protest, which has been presented to the Municipality of Florence.

Artistic Copyright.—Your Committee have had under consideration the questions of Artistic Copyright, and Messrs. Statham and Caröe were appointed to represent the Institute at the Conference.

Decoration of St. Paul's Cathedral.—This matter is engaging the attention of your Committee.

The following subjects have also received the consideration of the Committee:—Portrait of Sir William Chambers; Trinity College, Dublin; the Casino at Mont Saint-Michel; the Protestant Cemetery at Rome; the Kapell-Brücke, Lucerne; and the proposed Arts and Crafts Exhibition.

REPORT OF THE LITERATURE STANDING COMMITTEE.

The Literature Standing Committee report that since the election of the Committee on 6th June 1898 the Committee have held eight meetings. At the first meeting of the new Committee Mr. Alex. Graham, F.S.A., was reappointed Chairman, Mr. R. Phenè Spiers, F.S.A., Vice-Chairman, and Messrs. R. Elsey Smith and Arthur S. Flower, M.A., Hon. Secretaries.

The following Sessional Papers arranged for by the Committee have been read:—"The Comparative Value of Documentary and Architectural Evidence in establishing the Chronology of the English Cathedrals," by Francis Bond [*H.A.*], M.A. Oxon., F.G.S., on 21st November 1898; "Fireproof Construction of Buildings in the United States," by R. W. Gibson, on 5th December 1898 (under the management of the Science Standing Committee); "Some Practical Hints on the Production and Use of Electricity for Lighting Country Houses," by Bernard M. Drake, M.I.E.E., and "Practical Applications of Electrical Power," by H. R. J. Burstall, M.Inst.C.E., on 19th December 1898; "Public Baths and Washhouses," by A. Hessell Tiltman [*F.*], on 6th February 1899; "Municipal and Public Libraries," by J. M. Brydon [*F.*] and F. J. Burgoyne, on 20th February 1899; "Some Early Christian Churches in Palestine," by A. C. Dickie [*A.*], on 6th March 1899; 20th March, "Norman Vaulting in England," by John Bilson [*F.*]; 10th April, "The Application of Colour to Interior Ornament in Relief" (under the management of the Art Standing Committee). The following papers have been arranged for subsequent dates:—15th May, "The Architectural Element in Engineering Work," by H. H. Statham [*F.*]; 29th May, "Planning and Construction of Board Schools," by T. J. Bailey [*F.*].

The Committee desire to acknowledge their indebtedness to the authors of the several articles and reviews contributed to the JOURNAL during the past year, viz.:—Prof. Aitchison, R.A., the Cavaliere Boni, Prof. Baldwin Brown, Col. Lenox Prendergast, Major G. K. Scott-Moncrieff, R.E., Messrs. W. J. Anderson, John Bilson, A. T. Bolton, P. H. Boussac, James Burgess, W. Brindley, Frank Caws, S. Giampietri, Frank Granger, John Hebb, William Henman, E. W. Hudson, A. S. Murray, Roland W. Paul, J. Tavenor Perry, William Scott, William Simpson, R. Phenè Spiers, H. H. Statham, J. A. Strahan, A. E. Street, W. Wonnacott.

The new arrangement in reference to the date of publication of the JOURNAL, which is now issued on Saturdays, has been found to answer satisfactorily.

The Librarian has now completed the Supplement to the Brandon Catalogue up to the end of the year 1898. The Catalogue is in type, and will shortly be issued to members. It will occupy about one hundred pages of printed matter, and the Committee desire to take this opportunity of expressing their appreciation of the promptness and care with which this important work has been carried out by the Librarian.

The Committee have to report the satisfaction with which they have received from the family of the late Professor T. Hayter Lewis a valuable collection of books and pamphlets for the Library.

The Librarian reports to the Committee as follows:—

During the twelve months ending on the 31st March of the present year 262 volumes and 24 pamphlets have been added to the Library of the Royal Institute, exclusive of periodicals, reports and transactions of Societies, and parts of works issued in serial form.

The number of volumes presented to the Reference Library was 169.

The works purchased comprise 96 volumes, out of which 61 volumes were added to the Loan Library.

The attendances of readers and borrowers during the year numbered 4,241 (in 1897, 3,042; in 1898, 3,716), the number of works issued on loan being 1,163 (in 1896, 831; in 1897, 931; in 1898, 1,073). The number of attendances is shown in the following table:—

Date	Day Attendances. 10 a.m. to 5 p.m.					Evening Attendances. 5 p.m. to 8 p.m.					
	Members.		Non-members.			Members.		Non-members.			
	Library.	Periodicals only.	Library.	Periodicals only.	Total.	Library.	Periodicals only.	Library.	Periodicals only.	Total.	Books issued on Loan.
1898.											
April	33	14	68	8	123	28	12	38	1	79	86
May	52	14	92	10	168	21	9	49	12	91	98
June	39	18	62	6	125	32	9	48	6	95	93
July	51	7	60	2	120	25	4	33	9	71	55
August	Reference Library closed.					Reference Library closed.					29
September	42	6	55	6	109	25	4	47	5	81	64
October	96	4	109	10	219	47	3	95	7	152	102
November	79	17	136	15	247	33	8	79	11	131	129
December	64	9	95	19	187	39	13	66	10	128	110
1899.											
January	80	5	116	3	204	46	10	60	11	127	130
February	62	10	123	6	201	28	5	69	13	115	138
March	64	6	122	6	198	20	5	75	7	107	129
TOTAL	662	110	1038	91	1901	344	82	659	92	1177	1163

The number of volumes consulted in the Reference Library during the year was 6,322.

The number of tickets issued for admission to the Library other than to members of the Institute, or to Students and Probationers, was 53.

In accordance with the instructions of the Committee, a catalogue of the books received during the last twelve years (from June 1887 to December 1898) has been compiled. The final proofs of this are now under revision, and the catalogue will shortly be available for members.

Donations of valuable books have been received during the year from the executors of the late Professor Hayter Lewis, from Mr. Charles Fowler [*F.*], and from Mr. Andrew Oliver [*A.*].

Three portfolios of drawings by the late Mr. Robert J. Johnson, comprising the original drawings for his *Specimens of Early French Architecture*, have been presented by Mrs. Johnson.

Among other donations received during the year may be mentioned *Stockholm*, by E. W. Dahlgren, and *Operabyggnaden i Stockholm*, presented by Professor I. G. Clason [*Hon. Corr. M.*]; *Die Baukunst der Renaissance in Frankreich*, by Baron H. von Geymüller [*Hon. Corr. M.*], presented by the Author; *Landes-Gewerbemuseum in Stuttgart*, by Professor F. S. Neckelmann [*Hon. Corr. M.*], presented by the Author; Sach's *Modern Opera Houses and Theatres* (vol. iii.), presented by Mr. H. L. Florence [*F.*]; *Municipal Architecture in Boston, from Designs by E. M. Wheelwright*, presented by Mr. Wheelwright; *Histoire de l'Architecture*, by A. Choisy [*Hon. Corr. M.*], presented by the Author; *Traité d'Architecture*, by L. Cloquet, presented by the Author; *Einige Skizzen*, by O. Wagner [*Hon. Corr. M.*], presented by the Author.

REPORT OF THE PRACTICE STANDING COMMITTEE.

The Practice Standing Committee report that the usual monthly meetings of the Committee have been held. Mr. J. Douglass Mathews and Mr. Thomas Harris were re-elected Chairman and Vice-Chairman respectively. Mr. J. Osborne Smith and Mr. C. H. Brodie were elected Hon. Secretaries, Mr. Smith taking the place of Mr. Woodthorpe who resigned.

The points raised on the Institute Conditions of Contract referred to in the last Report, and also other important questions on these Conditions, referred to the Committee by the Council were very fully considered, and reports thereon sent to the Council, special attention being called to the decision in the Court of Appeal in the case of *Dodd* v. *Churton* (19th

March 1897) as affecting all contracts. The Lords Justices decided that the giving of extra work nullified the time for completion clause and consequent fine for non-completion.

A report was also sent to the Council on the question of the liability of architects for license as appraisers, intimating that, in the opinion of the Committee, they are not in ordinary practice liable to this tax.

The consideration of the Revised Schedule as to the Professional Charges to be made by Architects was continued and concluded, and the proposed new Schedule sent to the Council. After amendment by the Council, assisted by the Chairman and Vice-Chairman of the Committee, this was finally ordered to be issued as an Institute paper at a Special General Meeting on 27th June 1898. The Schedule, as finally amended and adopted and issued, was printed in the JOURNAL of the 23rd July 1898.

At the request of the Committee the Council have agreed to obtain counsel's opinion as to the liability of architects under the new Workmen's Compensation Act, and a list of questions to be submitted to counsel was drawn up by the Committee.

A suggestion that the Committee should be allowed to interview and advise members of the Institute as to difficulties arising in their practice was not agreed to by the Council, on the ground that this work was already undertaken by one of their own committees.

The Committee have considered the London Government Bill, and reported thereon to the Council.

REPORT OF THE SCIENCE STANDING COMMITTEE.

The Science Standing Committee report that they have held six meetings since the publication of the last Annual Report, with an average attendance of 8 members. Mr. P. Gordon Smith was appointed Chairman; Mr. W. C. Street, Vice-Chairman; and Mr. H. D. Searles-Wood and Mr. Max. Clarke, Hon. Secretaries.

The Committee are still awaiting the publication of the Results of the Experiments for the purpose of ascertaining the strength of different kinds of brickwork.

The Committee, having reported to the Council on the subject of standardizing the size of bricks to the effect that they should like the matter referred back to the Committee with a view to coming to an agreement with the Brickmakers' Association to fix the standard, appointed a sub-committee to meet a sub-committee appointed by the Institution of Civil Engineers, and a joint standard was agreed to by the joint committee and referred to the Association for discussion. The joint committee have not been able to meet to consider the replies of the Association owing to the absence from England of one of the members of the Engineers' sub-committee, but it is hoped that the standard will be agreed on in the course of a few months.

On the subject of Building Regulations for the purpose of reducing the liability of warehouses, &c., to destruction by fire, an interesting Paper was obtained from Mr. R. W. Gibson on the subject of American Fireproof Construction, and read at a General Meeting of the Institute. Further information is being obtained.

FINANCES.

The accounts of Ordinary Funds for 1898, prepared by Messrs. Saffery, Sons, & Co., chartered accountants, and audited by Mr. Zeph. King [*F.*] and Mr. F. W. Marks [*A.*], the Hon. Auditors appointed at the Annual General Meeting of 1898, here follow :—

Income and Expenditure Account of Ordinary Funds for the Year ending 31*st December* 1898.

Dr. Exclusive of Entrance Fees and Final Examination Fees; and Subscriptions received in advance for 1899. **Cr.**

EXPENDITURE.

To Ordinary Expenditure—	£	*s.*	*d.*	£	*s.*	*d.*
Rent	935	0	0			
Gas and Electric Lighting	75	4	5			
Coals	21	12	0			
				1031	16	5
Salaries				1229	3	4
General Printing, Stationery, Stamps, and Petty Expenses				471	5	8
Expenses of General Meetings, Exhibitions, &c.				189	13	1
Housekeeping (including Office Attendant)				138	9	1
Advertisements in Newspapers				29	17	0
Examination Expenses				252	3	9
General Repairs				144	15	10
Fire Insurance				20	4	6
Medals and other Prizes				83	5	6
Grant to Library				100	0	0
Grant to Architectural Association				100	0	0
The Journal—						
Reporting	54	12	0			
Printing and Binding	606	17	6			
Illustrations	129	14	4			
Addressing, Posting, and Carriage	228	5	6			
				1019	9	4
The Kalendar—						
Printing	141	2	0			
Posting and Carriage	22	7	9			
				163	9	9
Contributions to Allied Societies				238	9	0
Miscellaneous Expenses—						
Legal Expenses and Accountants' Charges	34	13	8			
Translation of Prof. Ussing's Pamphlet	10	0	0			
Frame for Portrait	11	0	0			
Books for Library (Special)	21	9	6			
Sundries	9	5	6			
				86	8	8
Birmingham Meeting and Annual Dinner				52	3	2
Balance of income over expenditure				1241	9	10
				£6592	3	11

INCOME.

By Ordinary Income—	£	*s.*	*d.*	£	*s.*	*d.*
Subscriptions—						
557 Fellows	2339	8	0			
Ditto, Arrears	67	4	0			
944 Associates	1982	8	0			
Ditto, Reinstated	2	2	0			
Ditto, Arrears	179	11	0			
49 Hon. Associates	102	18	0			
Ditto, Arrears	14	14	0			
				4688	5	0
Dividends on Stocks and Shares—						
Architectural Union Co.	157	16	0			
Consols	38	4	4			
Tasmanian Government Stock	16	19	0			
Interest on Deposit	33	3	9			
				246	3	1
Sale of Publications (other than Journal and Kalendar)				180	10	11
Use of Rooms—						
District Surveyors' Association	25	0	0			
Architectural Association	6	10	0			
R.I.B.A. Tenants	55	0	0			
				86	10	0
Examination Fees—						
Statutory	14	14	0			
Preliminary	487	4	0			
Intermediate	238	7	0			
Final (extra)	43	1	0			
				783	6	0
Journal and Kalendar—						
Advertisements	530	0	0			
Sales	77	8	11			
				607	8	11
				£6592	3	11

Saffery, Sons, & Co.,
Chartered Accountants.

Examined with the several vouchers and found to be correct. 21*st March* 1899. (Signed) { Zeph. King. F. W. Marks.

Dr. *Balance Sheet of Ordinary Funds,* 31*st December* 1898. **Cr.**

LIABILITIES.

		£	*s.*	*d.*	£	*s.*	*d.*
To Sundry Creditors outstanding					201	10	3
To Examination Fees anticipatory of election					97	13	0
To Subscriptions for 1899 received in advance					98	16	0
To *Accumulated Funds*—							
Surplus of Liquid Assets over Liabilities as per last Balance Sheet		6764	1	11			
Add Entrance Fees received in 1898		145	19	0			
Arrears for 1898 (as per contra)		201	12	0			
		7111	12	11			
Less Arrears included in 1897 account since received or cancelled	£305 11 0						
Balance of Brick-testing Fund written off	36 18 2						
Furniture bought	246 7 4						
		588	16	6			
		6522	16	5			
Balance of Income over Expenditure in 1898		1241	9	10			
					7764	6	3
					£8162	5	6

ASSETS.

	£	*s.*	*d.*	£	*s.*	*d.*
By Cash at Bank				1514	9	5
By Investments*:—						
Architectural Union Co., 263 Shares	3643	1	0			
Consols 2¾ per Cent. £2000	2037	17	5			
Tasmanian Government 3½ per Cent. Stock £501 2*s.* 9*d.*	550	0	0			
				6230	18	5
By Debtors				127	1	8
By Subscriptions in Arrear 1896–97	88	4	0			
Ditto 1898	201	12	0			
				289	16	0
				£8162	5	6

		£	*s.*	*d.*
* *Total of Investments in* 1897		4970	0	6
Additions in 1898, *viz.*—				
£1000 2¾ *per Cent. Consols*	£1112 7 11			
11 *A.U.C. Shares*	148 10 0			
		1260	17	11
Total Investments as above		6230	18	5

Saffery, Sons, & Co.,
Chartered Accountants.

Examined with the several vouchers and found to be correct. 21*st March* 1899. (Signed) { Zeph. King. F. W. Marks.

The Revenue Account and Balance Sheet of Trust Funds for the year 1898, audited by Mr. Zeph. King [*F.*] and Mr. F. W. Marks [*A.*], here follow :—

Revenue Account of Trust Funds for the Year ended 31*st December* 1898.

Dr.	£	s.	d.	Cr.	£	s.	d.
ALDWINCKLE STUDENTSHIPS :—							
To Cash paid Student 1897, 2nd instalment [A. T. Griffith]	25	0	0	By Balance from last Account	75	0	0
To Cash paid Student 1898, 1st instalment [J. B. Fulton]	25	0	0				
To Balance carried forward	25	0	0				
	75	0	0		75	0	0
ASHPITEL PRIZE FUND :—							
To Balance carried forward	22	7	0	By Balance from last Account	10	7	0
				By Dividend on 20 Shares, Architectural Union Co., at 12*s.* per share	12	0	0
	22	7	0		22	7	0
CHARITABLE FUND :—							
To Cash paid Architects' Benevolent Society	5	5	0	By Balance from last Account	0	18	4
To Balance carried forward	1	0	0	By Dividends on £200 10*s.* 2¾ per Cent. Consols	5	6	8
	6	5	0		6	5	0
DONALDSON TESTIMONIAL FUND :—							
To Cost of Medals	2	15	0	By Balance from last Account	0	10	0
To Balance carried forward	0	10	6	By Dividends on £72 L. & N.W. Railway 4 per Cent. Preference Stock	2	15	6
	3	5	6		3	5	6
GODWIN BURSARY :—							
To Cash paid Bursar 1897, 2nd instalment [R. S. Ayling]	20	0	0	By Balance from last Account	13	15	11
To Cost of Medal	1	19	6	By Dividends on £1030 Caledonian Railway 4 per Cent. Debenture Stock	39	16	6
To Balance carried forward	31	12	11				
	53	12	5		53	12	5
GRISSELL LEGACY :—							
To Cost of Medal	9	18	0	By Dividends on £300 Great Indian Peninsula Railway 5 per Cent. Stock	14	10	0
To Balance carried forward	4	12	0				
	14	10	0		14	10	0
LIBRARY FUND :—							
To Purchase of Books, Binding, &c.	112	18	8	By Balance from last Account	36	6	9
To Printing, Stationery, &c.	2	12	6	By Donation from Architectural Union Company	30	0	0
To Petty Expenses	2	9	6	By Annual Donation from Mr. Sydney Smirke	5	0	0
To Balance carried forward	60	12	7	By Donation from Mr. S. R. J. Smith	2	0	0
				By Entrance Donation of one Hon. Associate	2	2	0
				By Grant from Ordinary Funds	100	0	0
				By Fines (Loan Collection)	3	4	6
	178	13	3		178	13	3
OWEN JONES STUDENTSHIP :—							
To Cash paid Student 1897, 2nd instalment [A. E. Henderson]	25	0	0	By Balance from last Account	53	1	4
To Balance carried forward	132	13	2	By Dividends on £1773 6*s.* 8*d.* Midland Railway 3 per Cent. Debenture Stock	51	8	6
				By Dividends on £1100 Great Western Railway 5 per Cent. Consolidated Stock	53	3	4
	157	13	2		157	13	2
PUGIN MEMORIAL FUND :—							
To Cash paid Student 1897 [W. Heywood]	40	0	0	By Balance from last Account	13	17	10
To Extra Prize [B. Bower]	5	5	0	By Dividends on £1070 L. & N.W. Railway 4 per Cent. Preference Stock	41	7	6
To Cost of Medals	2	19	0				
To Balance carried forward	7	1	4				
	55	5	4		55	5	4
TITE LEGACY FUND :—							
To Cash paid Prizeman 1898 [J. S. Lee]	30	0	0	By Balance from last Account	16	15	10
To Extra Prize [T. A. Pole]	10	10	0	By Dividends on £1150 2¾ per Cent. Consols	30	11	4
To Balance carried forward	6	17	2				
	47	7	2		47	7	2
TRAVELLING FUND :—							
To Balance carried forward	42	14	5	By Balance from last Account	5	7	0
				By Dividend on £830 Madras Railway 4½ per Cent. Stock	18	9	0
				By Dividend on £870 ,, ,, ,, ,,	18	18	5
	42	14	5		42	14	5

Examined with the several vouchers and found to be correct. 21*st March* 1899. (Signed) { ZEPH. KING. F. W. MARKS.

Dr. *Balance Sheet of Trust Funds*, 31st *December* 1898. **Cr.**

	£	s.	d.	£	s.	d.
To Ashpitel Prize Fund:—						
Capital—20 Shares in the Architectural Union Company, Limited, at £14 per Share				280	0	0
Balance at credit of Revenue Account				22	7	0
To Charitable Fund:—						
Capital—£200 10*s.* 2¾ per Cent. Consols				195	14	9
Balance at credit of Revenue Account				1	0	0
To Donaldson Testimonial Fund:—						
Capital—£72 L. & N.W. Railway 4 per Cent. Preference Stock				89	0	0
Balance at credit of Revenue Account				0	10	6
To Godwin Bursary:—						
Capital—£1030 Caledonian Railway 4 per Cent. Debenture Stock				1344	13	6
Balance at credit of Revenue Account				31	12	11
To Grissell Legacy Fund:—						
Capital—£300 Great Indian Peninsula Railway 5 per Cent. Guaranteed Stock				513	14	10
Balance at credit of Revenue Account				4	12	0
To Library Fund:—						
Balance at credit of Revenue Account				60	12	7
To Owen Jones Studentship:—						
Capital—£2128 Midland Railway 2½ per Cent. Debenture Stock	1773	0	0			
£1100 Great Western Railway 5 per Cent. Consolidated Stock	1900	12	0			
Balance at credit of Revenue Account	132	13	2			
				3806	5	2
To Pugin Memorial Fund:—						
Capital—£1070 L. & N.W. Railway 4 per Cent. Preference Stock				1342	12	6
Balance at credit of Revenue Account				7	1	4
To Tite Legacy Fund:—						
Capital—£1150 2¾ per Cent. Consols				1109	1	6
Balance at credit of Revenue Account				6	17	2
To Travelling Fund:—						
Capital—£870 Madras Railway 4½ per Cent. Stock				1155	11	0
Balance at credit of Revenue Account				42	14	5
To Aldwinckle Studentships Fund:—						
Balance at credit of Revenue Account				25	0	0
				£10039	1	2

	£	s.	d.
By Government and other Securities for total value of Trust Funds invested	9704	0	1
By Cash in hands of Bankers	335	1	1
	£10039	1	2

Examined with the several vouchers and found to be correct. 21*st March* 1899. (Signed) { Zeph. King.
{ F. W. Marks.

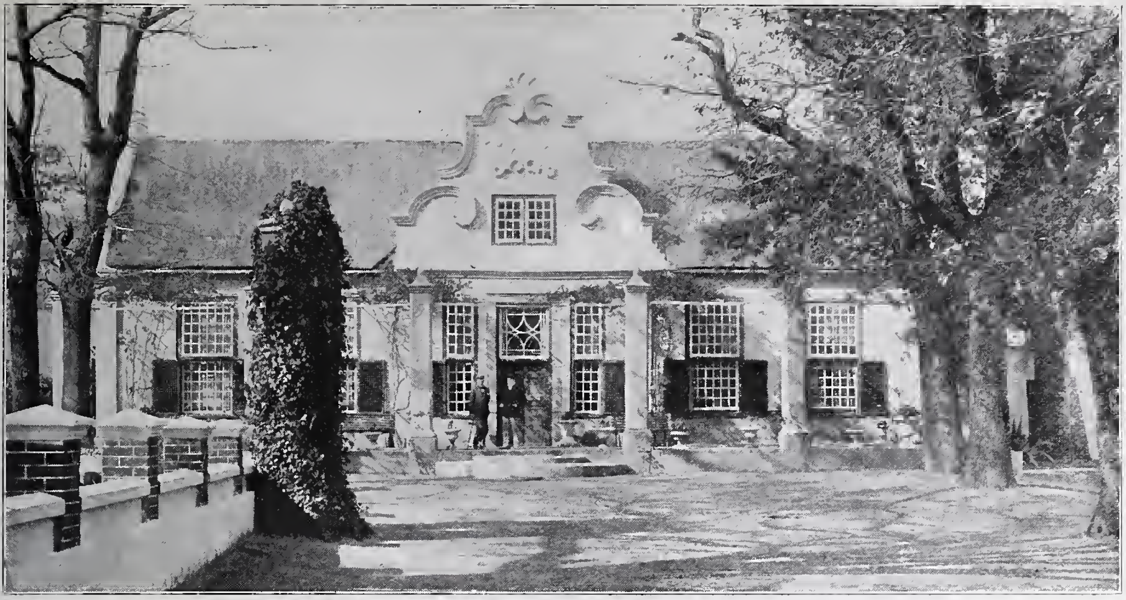
SCHEDULE OF PROPERTY.

	£	s.	d.	£	s.	d.
Furniture as per last year's Schedule	2435	13	4			
Additions in 1898	246	7	4			
	2682	0	8			
Less Depreciation	67	1	0			
				2614	19	8
Printed Books				4000	0	0
Oil Paintings				1800	0	0
Lithographs, Prints, &c.				400	0	0
Water-colours				600	0	0
Models, Plaster Busts, &c.				140	0	0
Marble Busts				150	0	0
				£9704	19	8

In conclusion, the Council submit an Estimate of Income and Expenditure of Ordinary Funds for the twelve months of 1899, exclusive of Entrance and Final Examination Fees:—

EXPENDITURE.	£	s.	d.
Rent, Lighting, and Warming	1060	0	0
Salaries	1275	0	0
General Printing, Stationery, Postage, and Petty Expenses	510	0	0
General Meetings, Exhibitions, &c. (including hire of Gallery)	245	0	0
Housekeeping (including Office Attendant)	145	0	0
Advertisements	35	0	0
Examination Expenses	260	0	0
General Repairs (including cleaning and painting of Premises)	100	0	0
Fire Insurance	25	0	0
Medals and other Prizes	155	0	0
Grant to Library	100	0	0
Grant to Architectural Association	100	0	0
The Journal (Reporting, Printing, Binding, Carriage, &c.)	1025	0	0
The Kalendar	165	0	0
Contributions to Allied Societies	250	0	0
Miscellaneous Expenses (including Dinner)	100	0	0
Legal and Accountants' Charges	50	0	0
Estimated Balance of income over expenditure	1100	0	0
	£6700	0	0

INCOME.	£	s.	d.	£	s.	d.
Subscriptions and Arrears				4750	0	0
Dividends on Stocks and Shares and Interest on Deposit Account				265	0	0
Sale of Publications (other than Journal and Kalendar)				190	0	0
Journal and Kalendar—						
Sales	80	0	0			
Advertisements	530	0	0			
				610	0	0
Use of Rooms				85	0	0
Examination Fees—						
Statutory	10	0	0			
Preliminary	500	0	0			
Intermediate	250	0	0			
Final (Extra Fees)	40	0	0			
				800	0	0
				£6700	0	0



MORGENSTEIR, SOMERSET WEST.

ARCHITECTURE IN SOUTH AFRICA.

A Review of the Past and Present.

By Arthur H. Reid [*F.*],

PAST PRESIDENT OF THE SOUTH AFRICAN ASSOCIATION OF ENGINEERS AND ARCHITECTS.

PART I.

In reviewing such a subject as the one I have undertaken, by request of the Editor of the Journal, it is somewhat difficult to separate the social history of the peoples to whom the Colonies are indebted for their architectural relics from the history of the buildings themselves. I think, however, that by carefully studying the illustrations that are proposed to be the chief attraction of this contribution a fair reflection of the social conditions of the inhabitants of this country from time to time must result; and perhaps their countrymen in Holland, France, and England may appreciate the disadvantages under which all the buildings have been constructed, and credit their authors with having done their best to reflect the traditions and artistic tastes of their individual nationalities. Although the history of South Africa as a European settlement dates back to 1652, when Commander Van Riebeck founded the first Dutch settlement, the author will limit his remarks to the two centuries, 1700 to 1900; for it was, as a matter of fact, under the *régime* of Simon van der Stel, from 1679 to 1699, and after the arrival of the Huguenot refugees in 1689, that really permanent homes and public buildings were erected, and it is from that period all the works to be reviewed were conceived or constructed. To Van der Stel we owe the interesting and somewhat ornate portions of the castle now occupied by the General in command of the Forces, and it is understood that he brought out with him from Holland much of the materials and fittings used in their construction. The entrance to the castle [fig. 1] was about the first work undertaken, and the enrichments in the tympanum and frieze comprise arms of the different Netherlands pioneers, the monogram of the Dutch East India Company, ands other emblem.

For some years religious services were held in the hall of the General's quarters, until

1704, when the old Dutch Church was completed, some portions of which form part of the present Dutch Reformed Church in Adderley Street [fig. 2]. Van der Stel was not content with applying his energies to the settlement only, but soon struck out inland, the result of his expedition being the town of Stellenbosch. The first house was built at Zwaanswijck, and is now used as a barn; but, to show the character of the people of those days, and their desire to do everything well and substantially, all the joinery of this old barn was constructed of solid teak. It was about this time too that the well-known estate at Constantia, on the boundaries of the present township of Wynberg, was built by Van der Stel, and the celebrated vineyards were planted which produce the wine bearing the name of the estate. After exchanging owners many times, this fine property became the home of the Cloete family, and it can fairly be said that the whole place is thoroughly characteristic of the times and the leading people, and, being so, I shall do my best to describe the salient features of its construction, planning, architecture, and fittings. A general view of the house is shown in fig. 3, and practically comprises the characteristic features of all the old Cape buildings. The roof is entirely of rush thatch, without eaves, gutters, or any means of intercepting the rain-water. The walls are entirely of locally made bricks, the output of the slave labour of those days, and are plastered outside with lime made from burnt shells collected on the shores of Table Bay, the whole being washed

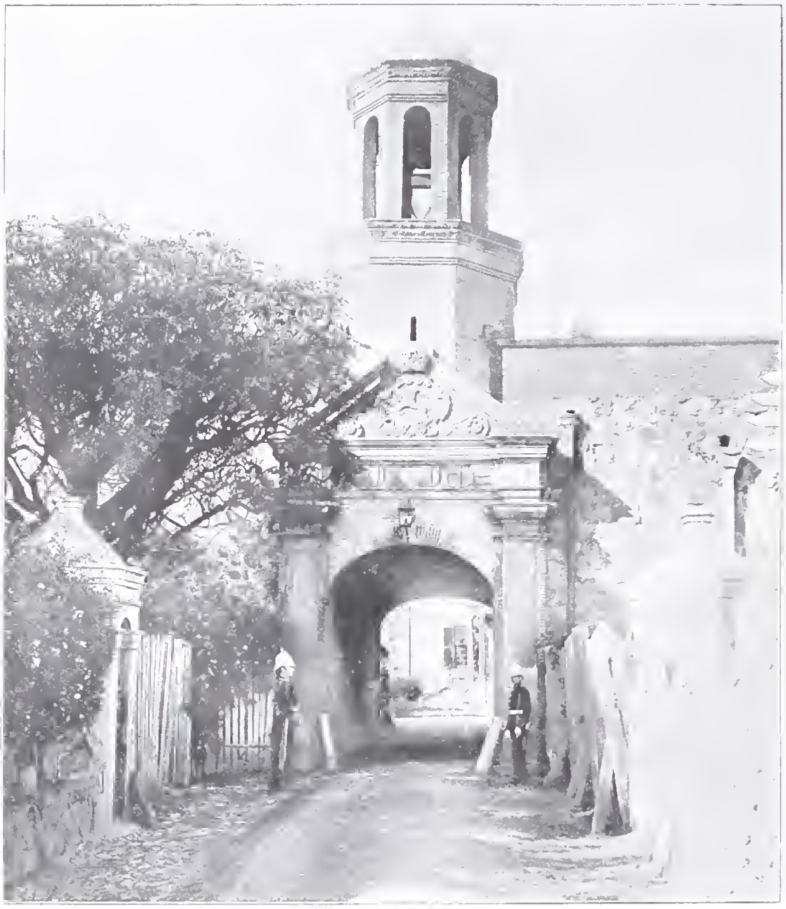


FIG. 1.—ENTRANCE TO THE CASTLE, CAPETOWN.

with white lime water. The mouldings are essentially flat in section, the window-frames are of teak, the top sashes being, as they are, strange to say, in nearly every house, fixtures, and the lower sashes, as a rule, not hung by lines and weights, as in modern windows. The frames are in all cases fixed flush with the outside face of the wall, and the sashes glazed with small panes of glass, doubtless owing to the difficulty of getting larger ones in those days. Teak shutters of quaint pattern are hung by hook hinges with ornamental plates of original design, all of which were, it is said, made by artificers who were specially sent out by the Dutch Government to assist in the constructive works that Van der Stel had laid himself out to initiate. The sashes are invariably painted white, and the frames and shutters green. The doors and frames generally match the windows. It will be noticed that an utter disregard to the escape of foul air from the upper portions of the rooms exists, and it may fairly be said to exist in every old building. The natural consequence is an escape of foul air through the floors into the rooms above, when the houses are double-storied. The inside ground floors are generally of large square, red, imported Dutch tiles, for coolness in summer, though in some of the better-class houses an excellent glazed tile was used. The principal reception-rooms, however, generally had boarded floors of colonial hardwoods, such as stinkwood or yellow wood, and in many cases teak. Skirtings were not generally considered a necessity, and a painted dado was often substituted for them. Ceilings were universally discarded, as the tie-beams of roof-trusses were wrought, and left exposed to view from below. On the top of these beams hardwood flooring was fixed, and on the upper side of that a layer of "brand solder," or pugging of clay and chopped straw, was laid about three inches thick to keep the rooms cool and to prevent dust from falling through the joints of floors, which were not rebated or tongued as they are in more modern buildings. Cornices or mouldings of any kind to the under side of the flooring are unknown. The tie-beams were always massive timbers about 8 inches by 6 inches, as great weights were often put upon the floors, the roof-space being used for

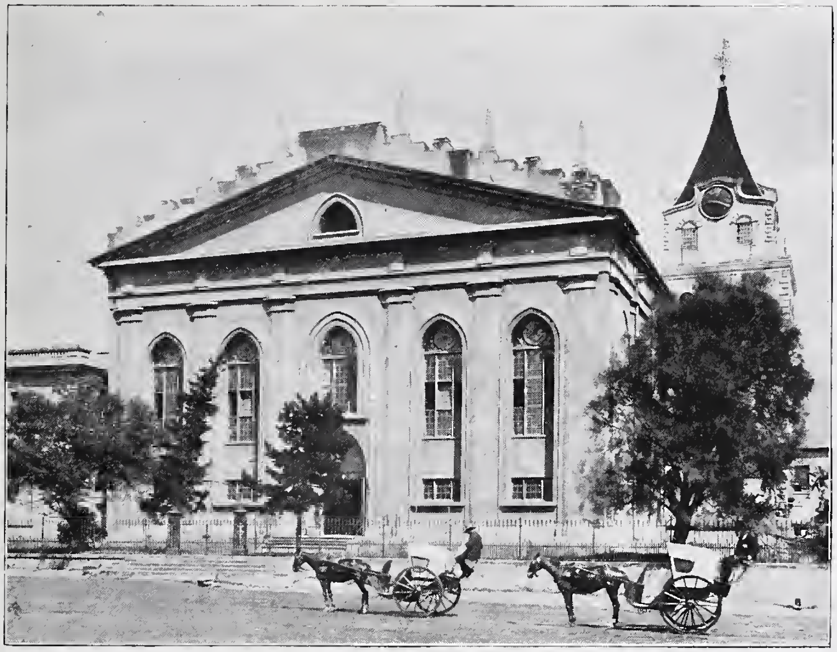


FIG. 2.—THE DUTCH REFORMED CHURCH, CAPETOWN.

storage purposes. Hence the large windows generally found in the gables, few, if any, of which open, thus keeping up the apparent disregard of ventilation. Fireplaces or chimneys were seldom considered necessary, and their absence or scarcity in all houses is a feature that at once strikes a newcomer. The inside doors are generally of stinkwood or teak, and are marvellous to modern eyes on account of their enormous size and the fact that nearly all have only one, or at most two panels, which, if one may judge by the general absence of cracks or open joints, must have been in one width. The writer has examined many upwards of 30 inches wide, and failed to detect any joint.

Applied mouldings to panels or joinery were unknown, all stiles and rails being solid moulded to their panel arrises. The panels, as a rule, were raised both sides with splayed margins, and scrolled with sometimes enriched corners. The few original locks that exist are of the old "stock" type, with brass handles of the "crutch" type, and heavy brass hinges of thoroughly good and quaint design. Finger-plates seem to have been unknown. The shutter-hooks, hinge-plates, and holdfasts are generally of solid brass, of severe but pleasing design; indeed, all these details, in their thoroughness and spirit, reflect the cultured common-sense of those who designed and paid for their manufacture, which is generally stated to be the result of the imported artificers before referred to. Curved transoms to both doors and windows are not uncommon, and some of them are heavily moulded; the old door that was originally in the castle, and is now the property of Mr. Rhodes at Groot Schuur [fig. 4], is a fair sample, and the only one that the author has seen with bolection mouldings to the panels, which may be a modern addition. The elaborate keyhole-plates and escutcheon, as well as the carved tracery to the fanlight, are interesting as illustrating some of the foregoing remarks; and the front view of Groot Schuur [fig. 5] shows a type of the large panelled door and gable lights before referred to.

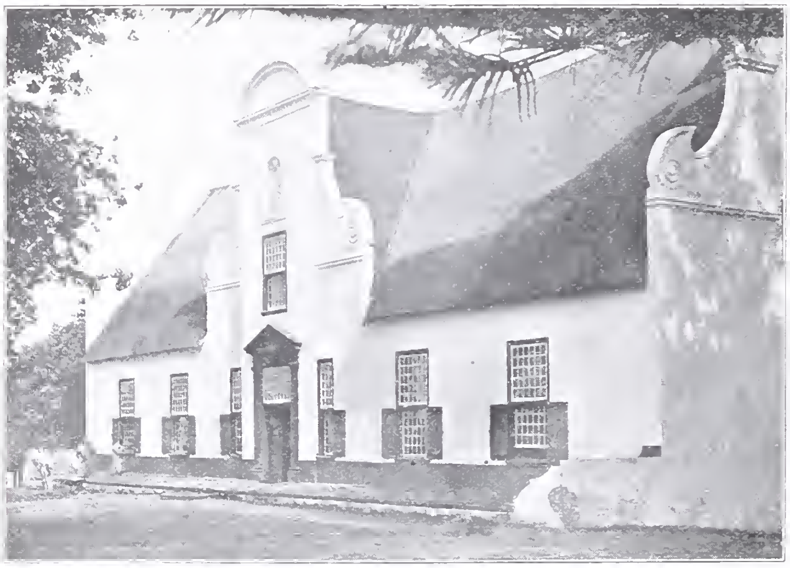


FIG. 3.—GROOTE CONSTANTIA, WYNBERG.

The "stoep" is absolutely a feature of all Cape houses, whether old or new. The floor, as a rule, is of the well-known small yellow Dutch bricks laid on edge, or of large red tiles imported from Holland. The ends, as a rule, have low walls across them, with seats and wing-walls. Brick-plastered pillars are built along the front to support a vine trellis, but, strange to say, they are seldom covered by a roof or verandah. Perhaps the quaintest architectural feature to be found in all the old homesteads is the gable, dear to the heart of all true Dutchmen, and one in the treatment of which I think they may fairly be allowed to excel. A perusal of the illustrations will make this point self-evident, but as a further illustration the author would call attention to that at the head of this article (Morgensteir, Somerset West, built about 1776). But undoubtedly the most ambitious, artistic, and beautiful gable of all is that over the entrance to the wine-cellar at Groote Constantia [fig. 6], where the tympanum is enriched by the finest piece of plaster modelling to be found in the country. In vain the author has endeavoured to ascertain the name of the artist and designer. The scheme is of the Bacchanalian type, showing children sporting and intertwined with bunches of grapes, with a centre feature of a tiger grotesque, encircled by an oval festooned margin or frame of original and beautiful design, from the bottom of which exquisitely modelled drapery swags past to the right and left, where the ends terminate in the clutches of two children. The whole scheme is full of vigour, magnificent in execution, and a lasting testimony to the excellent class of skilled labour that was present here in those days, but has not found patrons either in public bodies or private individuals since.

Entrance gates and approaches to the homesteads have in the better class of old houses received considerable attention. With regard to the internal arrangement in planning of the older houses perhaps the less said the better, as from a modern point of view they do not realise the ideals of comfort, convenience, or privacy. The vestibule or "voorhuis" is certainly a feature that might with advantage and a due regard to privacy be perpetuated by modern architects, or rather their clients. It was usually of large size, run back from front to back of the house, and divided into two or more sections by wooden glazed screens, so that the back portion could be used as a room, or the whole as a ball-room. From this "voorhuis" both sitting- and bed-rooms opened, which meant that the servants in the execution of their duties in the bedrooms were constantly in contact with the guests or inhabitants of the house. Passages were seldom introduced into the plans of a residence, as the roofs, being of thatch, could not be safely constructed to cover more than the width of one room, especially as they were in those days of great width. The difficulty was overcome by throwing out wings with an enclosed yard between them. The "voorhuis" would be in the centre of the front or entrance-block, and be surmounted by a gable.

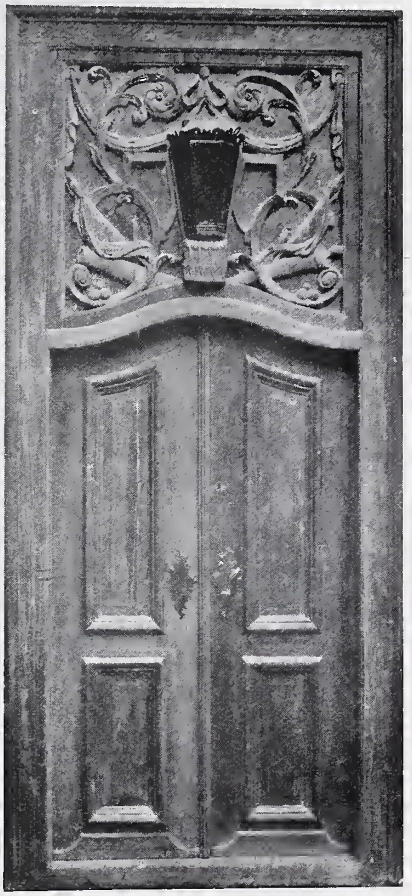


FIG. 4.—OLD DOOR FROM THE CASTLE, CAPETOWN.

Wall cupboards in the larger houses were often prominent features, in which the large panelled doors played a prominent part, and involved much skill and labour in producing the brass hinge-plates, escutcheons, &c., that were fitted to them.

As the town of Capetown increased in size, however, thatch roofs became dangerous and difficult of adaptation to the needs of town life. In the town residences, though the "voorhuis" remained a distinct feature in the planning, branch passages were thrown off it to serve rooms that flanked them on both sides. This of course involved roofs of larger span than could well be covered with thatch in one span. A substitute was therefore found in the flat roof of shell-lime concrete that has always been, and is still, a characteristic of old Capetown houses. Of course, parapet walls were a necessary adjunct to these flat roofs, and are a marked departure from the open eaves of the thatched roofs. The lime concrete was made of slaked shell lime, mixed with broken shells, and deposited upon the upper side of the ceiling boards of the rooms, which were supported by ponderous beams, wrought and moulded on their arrises, and spanning the whole width of each room. It was usually about six inches thick, and while wet the surface was beaten all over, so as to work the whole lot into a compact mass and bring the lime up to the surface. As a rule, nothing more was done, and the roofs remained fairly water-tight; but many were covered with red tiles, and provided a splendid promenade or drying ground. They are marvellously cool, and easily repaired should they crack through expansion or contraction during changes of temperature. No better example of this class of building could be found than the old Town House [fig. 7], which was built in the year 1755, and is the most elaborate structure of the times now to be found in the city of Capetown. A careful inspection of its architectural details will be interesting, if not instructive.

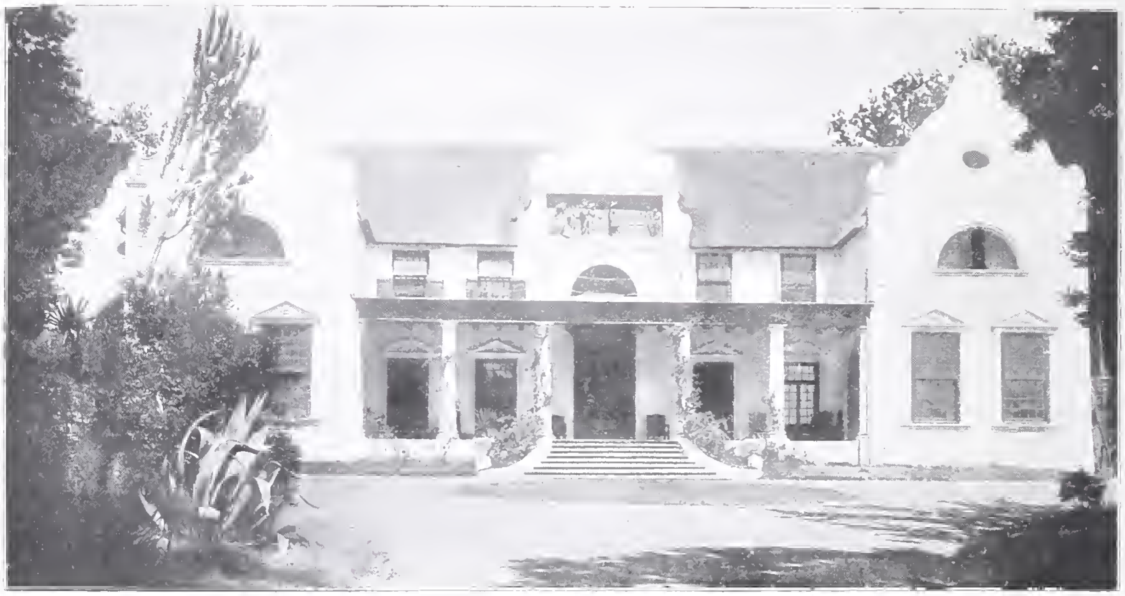


FIG. 5.—GROOT SCHUUR, CAPE.

In many of the town and country houses, quarters were provided for the slaves who were in general use by the more wealthy burghers prior to the English occupation and ultimate emancipation by the British Government in the year 1833. At Constantia these quarters were situated in the rear of the building and under the dining-hall, and were dark crypts or cellars. Fig. 8 (Stellenberg, near Wynberg) shows the old slave quarters of that mansion as they existed in a special detached building.

There is an interesting homestead, erected in 1800 during the first British occupation.

The farm is named Le Dauphiné, and is situated in the district of French Hoek, near Paarl. It is generally conceded that the homesteads of French Hoek contained a magnificent collection of old furniture, chinaware, and articles of great value, brought from their unhappy but dear old homes by the French Huguenot gentry, who as refugees were settled in this particular district by Van der Stel. Even now many of the wardrobes and cupboards have solid silver handles, and at a Mr. Hauman's there is a fine old carved ebony chair, of German origin, brought over by his ancestors in the eighteenth century. Many fine specimens of Chinese pottery and other ware were to be found in these old homesteads, but they have been purchased by wealthy visitors from time to time and removed to other centres. Mr. Rhodes has many valuable relics among his collection at Groot Schuur.

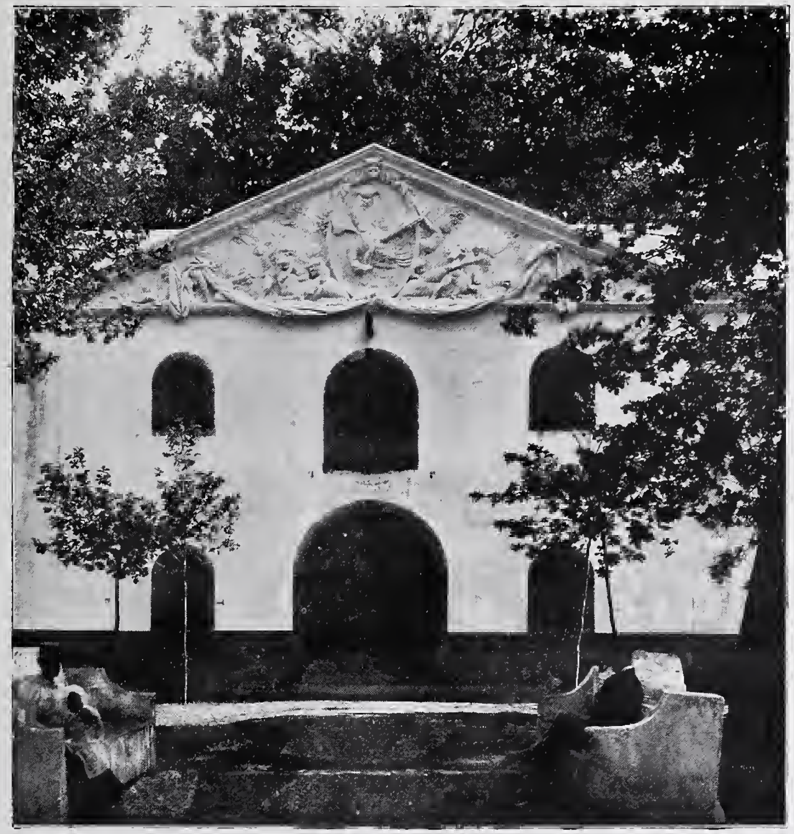


FIG. 6.—PEDIMENT TO WINE STORE, GROOTE CONSTANTIA, WYNBERG.

Stellenberg Farm (Kenilworth, near Wynberg) is a most interesting example of one of the fine old homesteads of the eighteenth century. The village of Wynberg was founded in 1839 or 1840, and Stellenberg was the residence of Commissioner de Mist in 1803. The plan is of the orthodox type, with the usual central hall or "voorhuis," with rooms opening out of it on each side and carried out as wings in the rear, and there connected by a wall with a gate in it, thus forming an enclosed yard. The design of the bolts, handles of doors, and of catches to shutters is very quaint, and finger-plates are to be found on the doors.

It was in the year 1800 that the foundation-stone of the existing Dutch Reformed Church in Capetown was laid, a view of the present appearance of which is shown in fig. 2.

The only attempt at frescoes as mural decoration that the author can hear of is to be found at the homestead "Libertas," near to Stellenbosch, which was reconstructed by one Adam Tas in 1771, at which time a German artist painted, among others, the cartoon of "Charity" over the peculiarly crude fireplace in the central hall. This fireplace is concealed by teak panelled doors for use in the summer season.

In 1795 the English fleet sailed into Simon's Bay, and, after a skirmish, took possession of the colony and held it until 1801. During this period, on account of the general unrest consequent upon the change of government, little appears to have been done in the building line. In 1801 the country was given back to the Dutch, and in 1802 Commissioner de Mist and General Janssens hoisted the flag of the Batavian Republic at the Castle; and then commenced the oppression of the British settlers who had remained in the country, which was carried on in spite of protests and threats until 1806, when General Sir David Baird with a large force landed at Saldanha Bay and marched upon Capetown, meeting and routing General Janssens' army at Blauwberg. From this time it may be said the social conditions of the people began to change—as far as the polite arts went, it would seem not for the better. The first building of any importance that was undertaken during the second British occupation was St. George's Cathedral, built when Sir Lowry Cole was head of the Government. For many years sedan chairs continued in use, and, as no waterworks had

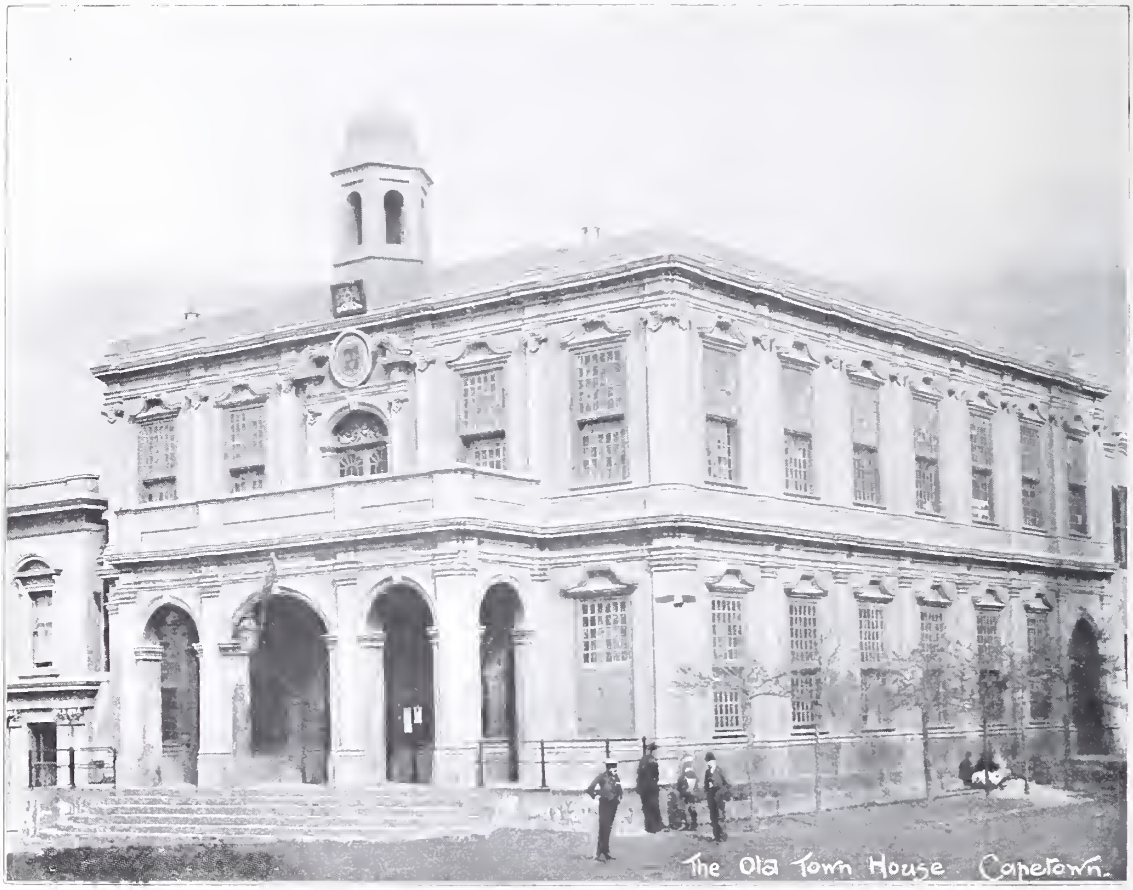


FIG. 7.—THE OLD TOWN HOUSE, CAPETOWN.

been constructed, the water for domestic purposes had still to be carried from wells. With the abolition of slavery the farming community were absolutely ruined, and desolation took the place of comparative prosperity in the country districts where the farmers were without labour. Their old homes soon lapsed into disrepair, and for want of money and labour many fell into a more or less ruinous condition. For this reason the author has felt much pleasure in providing his professional brethren of South Africa, as well as those in Europe, with a memento of what has been done in the past and is now slowly but surely disappearing under the aggressive influence of modern requirements.

And now let us pass on, and imagine that fifty years have passed as a dream, for from an architectural point of view the less said about those fifty years the better. The only relics of those years are such monstrosities as the present Supreme Court Buildings, the demolished Exchange, St. George's Cathedral, and a few other equally uninteresting structures that are already doomed, and will shortly have disappeared, to make way for nineteenth-century edifices that will be handed down to posterity as a reflection of the popular taste of *our* days, in the same way as the old Dutch relics that it has been my privilege to describe illustrate to us the tastes and social peculiarities of those fine old gentlemen who have passed away but are not forgotten. May our works do us credit, and may the coming generation of architects give us credit for having done the best we could under existing local circumstances!

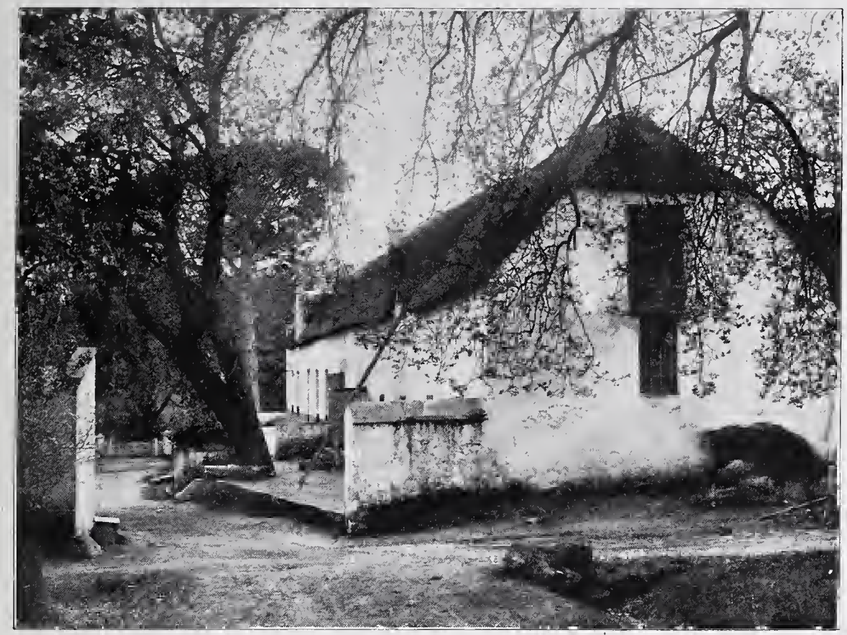


FIG. 8.—OLD SLAVE QUARTERS, STELLENBERG, WYNBERG.

In the remarks that are to follow in another number of the JOURNAL my readers must understand that I have only selected some of the largest and best works of our South African architects, all of which have been carried out during the twenty-two years that I have been resident and in practice in South Africa. The monstrosities emanating from the jerry-builder and architectural parasites had better be passed over in the silence that is golden.

(*To be continued.*)

View of Rouen, drawn by Jaques Lelieur in 1525.

REVIEWS.

ROUEN ("MEDIÆVAL TOWNS SERIES").

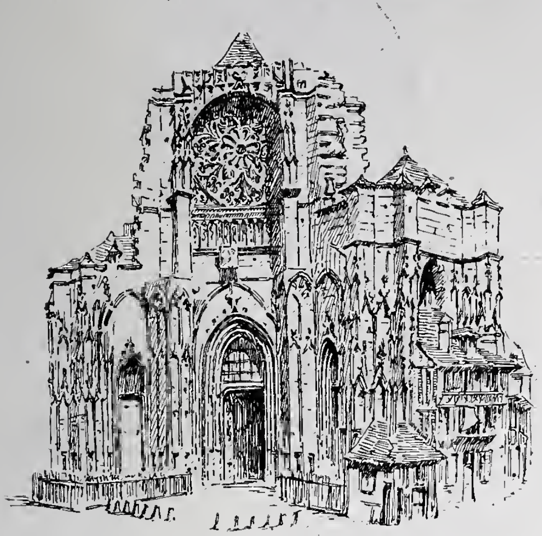
The Story of Rouen. By Theodore Andrea Cook. Illustrated by Helen M. James and Jane E. Cook. Fcp. 8o. Lond. 1899. *Price* 4*s.* 6*d.* [*Messrs. J. M. Dent & Co.,* 29–30 *Bedford Street, Covent Garden.*]

The volume before us belongs to the "Mediæval Town Series" of Messrs. Dent, of which the volumes on Perugia, Rouen, and Toledo are now published. The whole Series deserves our warmest commendation. The Perugia volume has already reached a third edition. The new volume on Rouen is a feast of good things from cover to cover. It encourages one to hope that the day of the dryasdust guide-book is over—at any rate for the Continent. We remember well a visit to Brescia, under the guidance of Mr. Hare's *Cities of Northern Italy.* Lists there were in abundance of second-rate pictures and third-rate masters, but the author had not even discovered the existence of one of the most precious remains of Christian antiquity—no less than an eighth-century basilica. Mr. Cook's method is very different; he recognises that architecture is the authentic expression of life and history; that not merely an advance in time but a different phase of life and feeling is represented by the buildings which successively arise. He has amply realised the ideal set forth by the conductors of the Series. Author and artist have both "made the objects and scenes described the subject of careful personal observation, and have imparted to their work that charm of local colour which lends vitality to their pictures; every old-time thoroughfare and weather-beaten fabric supplies some legend of saint or hero, and as the story progresses the reader's imagination is kindled until the very spirit of the past pervades the page and peoples the scenes with the picturesque attributes of former times."

Even to architectural students who know their Rouen much that Mr. Cook has to tell will be new. His account of the Norman work in the church of St. Gilles, the chapel of St. Julien, and the apse of St. Paul is both interesting and important. He enters into the very spirit of the bygone builders. This is how he approaches Rouen Cathedral:—

> Through those doors, which were shut sternly in the face of princes under the Church's ban, the poor man gladly passed from the hovel that was his home. Out of the dark twisting streets whose crowded houses pressed even against the walls of the Cathedral, the humblest citizen might turn towards the beauty of a building greater and more wonderful than any that his feudal lord could boast. He found there not merely the sanctuary, not merely the shrine of all that was holiest in history or in creed, but the epitome of his own life, the handicrafts of his various guilds, as at Rouen, the tale of all his humblest occupations, the mockery of his neighbours' foibles, the lessons of the horror of sin. For before the end of the thirteenth century, the handicraftsmen, associated into such guilds as we have seen in Rouen, had not only won their freedom from arbitrary oppression, but had secured so large a share in the government of the towns, that, within the next fifty years, the heads of the communes were nearly always the delegates from the craft guilds. The zenith of Gothic architecture coincided with this period of their triumph; its bright, and glittering, and joyful art spread all over the intelligent world, and more especially in France; it was not contented with merely architectural forms in colourless cathedrals, but decorated them with carvings painted in gay colours, used

every space for pictures, drew upon all literature for its materials. In Dante, Chaucer, and Petrarch, in the German *Niebelungenlied*, in the French romances, in the



The original West Front of St. Ouen which was pulled down to erect the modern façade.

Icelandic Sagas, in Froissart and the chroniclers, you may find the same spirit; and each town smote its own epic into stone upon the walls of its cathedral. Every village, even, had its painter, its carvers, its actors; the cathedrals that have remained are but the standard from which we may imagine the loving perfection to which every form of craftsman's art was carried. And their work gives us such pleasure now because they had themselves such intense pleasure in doing the work.

The book is excellently equipped with maps, plans, and illustrations; many of them—*e.g.* the view of Rouen, drawn by Jacques Lelieur in 1525 [see opposite page], and that of Rouen as shown in the engraving by Mérian in 1620—are of the utmost importance and interest. The book possesses also five maps showing respectively the natural position of Rouen on the Seine, and the gradual development of the place from the earliest Gallo-Roman citadel to the modern town. All the streets, houses, and public buildings mentioned are clearly marked, so that the reader is able to find his way to one point of interest after the other, and watch the unfolding of the story of the town by tracing its progress from the earliest relics of Christian architecture to the latest development of modern commerce.

Of particular interest is an architect's sketch of the façade of St. Ouen, made in 1846. It was the very reverse of the façade of St. Maclou, which curves outwardly. At St. Ouen there is a curve inward, in which the central door was "pushed back, and at an angle on each side of it the arched portals of the aisles curved forwards, and above them rose two towers, each a reduced copy of that larger exquisite central tower which crowns the Abbey. Though the old masonry remained, and though a complete working drawing of the whole façade was discovered in the archives of the town, the job of pulling everything down and building the new and horrible spires was given to an architect who had already destroyed an old tower in the angle of the courtyard of the Palais de Justice, and had made a 'grille' for its façade filled with inconsequent anachronisms and errors."

We cannot imagine a more delightful way of spending a week than to pass it at Rouen under the guidance of Mr. Cook's little book. The ancient city is still crowded with beautiful architecture, and its wealth of late painted glass is only equalled at Troyes. Particularly commendable is the action of the Government in turning all the windows of one of the churches into a repository of the painted glass which has been saved from secularised churches. And in the Museum the authorities have adopted the excellent plan of arranging in chronological order a series of specimens of old glass of every period; nowhere can one study stained and painted glass so well; their procedure might well be copied by the South Kensington authorities. One or two minor slips may be noticed. The author pleads earnestly for a reproduction in London of the "Field of the Cloth of Gold" from the Hôtel Bourgtheroulde. Is he unaware that a reproduction of the whole façade is to be seen in the Crystal Palace? He describes the crypt of St. Gervais—we wonder how many visitors to Rouen have seen it—built soon after 404, as the oldest crypt in France. It may be so; but there are crypts under crypts, both at St. Germain, Auxerre, and beneath Chartres Cathedral, which seem of immemorial antiquity.

He mentions that the "Lai d'Aristote" occurs in stone on the exterior, and is repeated in the stalls, on the misericorde which "is the ninth of the top row on the southern side. The gay young lady seated upon Aristotle's back wears the high two-horned headdress of the fifteenth century, and a long closely-fitting gown, with the open bodice that was the mark of the oldest profession in the world. She is controlling the philosopher with a bridle and a most murderous-looking bit between his teeth. I have already explained that Socrates and Xantippe are by no means intended here, and that the tale is represented of the downfall of Aristotle in his attempts to prove to Alexander the Great how easily the charms of women might be resisted. The subject seems to have tickled the Middle Ages immensely, and was especially likely to be popular in Normandy, where Henry d'Andelys, the author of the poem called 'Lai d'Aristote,' was born. A very similar tale of the gallant adventures of the poet Virgil occupied one of the lost stalls of this cathedral, and in St. Pierre de Caen both were represented among the carvings of the church."

As a matter of fact, the carving at St. Pierre, Caen, is there still, and we have taken the trouble to reproduce it for Mr. Cook's benefit. But these are small flaws in an excellent book; as the Master of Trinity observed, "we are none of us infallible, not even the youngest of us." But there is an astounding statement on p. 116 which really cannot be passed over, where Mr. Cook tells us that he would like the term "Gothic" to be abandoned in favour of "French"! But "if it is too much to expect of future writers that they will give up the phrase, let them at least follow the advice of Mr. Moore, and limit 'Gothic' to the French Pointed School of the Ile de France." This simply takes the breath away. The mischief Mr. Moore's book has done to tender minds is simply incalculable. We advise Mr. Cook to cast away the works of darkness and Mr. Moore, to read, mark, learn, and inwardly digest the article on Mr. Moore's book which appeared in the *Builder* for the 15th March 1890, p. 185, and to perpend the recent utterance of M. Choisy: "En dehors de la France centrale *l'architecture anglaise* est une de celles où le génie gothique se manifeste avec le plus d'originalité." The italics are our own.

Francis Bond.

9, Conduit Street, London, W., *6th May* 1899.

CHRONICLE.

Members of the Institute acting as Assessors in Architectural Competitions.

On the recommendation of the Competitions Committee the Council desire urgently to draw the attention of members to the following resolution passed at the Meeting of the Council held on Monday, the 1st inst.:—

> "That any member of the Royal Institute asked to act as Assessor, subsequent to the conditions of the competition having been drawn, should obtain a copy of the conditions and consider their conformity with the 'Suggestions' issued by the Royal Institute, and should also notify to the Secretary of the Institute that he has been asked to act."

New Nomination to the Council.

The following nomination to the Council has been made by Fellows and Associates conformably with By-law 30, namely:—

Sidney Robert James Smith [*F.*], nominated by Alex. R. Stenning, A. Hessell Tiltman, Francis J. Smith, Wm. Harvey, Theo. Allen, *Fellows*; Clarence T. Coggin, Syd. Fowler, *Associates*.

The Spring Statutory Examination.

Pursuant to section 140 of the London Building Act 1894, an Examination of Candidates for Certificates of Competency to act as District Surveyor in London was held by the Institute on the 20th and 21st ult. Of the five gentlemen who presented themselves and were examined, four passed and have been granted by the Council certificates of competency. The following are the names and addresses of the successful candidates:—

Harold Douglas Eldridge, of Sandycoombe, East Twickenham.
Henry Hoyne Fox [*F.*], of 30, Criffel Avenue, Streatham Hill, S.W.
Harry George Leslie, 20, Salvin Terrace, Putney.
Christopher William Surrey [*A.*], of 10, Neville Terrace, South Kensington, S.W.

President of the N.S.W. Institute elected Fellow.

The Council, at their Meeting on the 1st inst., elected the following gentleman to the Fellowship of the Royal Institute, under the proviso to By-law 9:—

John Barlow, of Lyndhurst Chambers, 84 Elizabeth Street, Sydney, New South Wales, President of the Institute of Architects of New South Wales.

The Decoration of St. Paul's.

Minute of Interview regarding the Decoration of St. Paul's Cathedral, held at the Deanery on April 15th, 1899.

Present on behalf of the Chapter of the Cathedral:

The Dean of St. Paul's.
Archdeacon Sinclair.
Canon Newbolt.

And on behalf of the Council of the Royal Institute of British Architects:

Professor Aitchison, R.A., *President*.
Ernest George, *Vice-President*.
J. M. Brydon } *Members of Council.*
E. W. Mountford }

Mr. Brydon having explained that the deputation from the Institute did not appear in any unfriendly spirit either to the Decorations Committee or to Sir William Richmond, but rather for the purpose of stating their views as architects on the decoration of St. Paul's now going on, called attention to the injurious effect of the stencilling on the cornice and frieze of the great order of the interior and the arches under the dome; also to the panels and rosettes recently inserted in the triangular spaces in the alternate arches, which had with great judgment been left plain by Wren, with the result that the scale and breadth of effect and the dignity of Wren's work were being destroyed.

This was supported by Mr. Ernest George and Mr. Mountford, who also remarked upon the lettering round the semi-domes as producing a crowded effect, highly detrimental to the richness of the work immediately above and below it.

These various matters having been fully discussed, the Dean assured the deputation that what had been said would be carefully considered by the Decorations Committee at their next meeting, but that it might be taken that the stencilling was experimental and would be all thoroughly reconsidered and probably removed, though in the absence of Sir William Richmond and Mr. Somers Clarke the Dean felt he could say nothing further, except that he was glad to have had the opportunity of hearing expert opinion on such important matters.

After thanking the Dean for his courtesy, the deputation, accompanied by Archdeacon Sinclair, proceeded to the Cathedral, went up on the scaffolding and inspected the work now in progress. While there, attention was attracted to an iron railing fixed on the main cornice over the north portion of the organ. The Archdeacon explained that it is intended to carry such a railing all round the Cathedral to enable a close view to be had of the mosaics; whereupon it was pointed out that if this were done the proportion of the attic above the main cornice would be seriously impaired, and it was urged that if a railing were really found to be necessary it should be of a very much lighter and more open design, so as not to interfere with the architectural lines of the interior.

It was hoped that Archdeacon Sinclair would kindly bring this point before the Committee for reconsideration.

The deputation maintained generally that if any architectural feature (such as cornice, architrave, or panel) is to be coloured or gilt, it is desirable to treat the whole of such feature as one, and not pick out parts, by which latter course the scale, proportion, and expression of the mouldings are lost.

⁂ An article in the *Saturday Review* of the 22nd ult., from the pen of the well-known D. S. M., entitled "Largely Experimental," expresses so admirably the general views entertained by architects on the decorative work in progress in St. Paul's Cathedral, that the following extracts from it may fitly be inserted in the Journal:—

"The Dean of St. Paul's may be thanked for exposing in a word the alarming frivolity of which 'a committee of taste' is capable in dealing with the church entrusted to its care. Questioned by a deputation from the Institute of British Architects, he replied that the decoration under the dome was 'largely experimental.'" . . . This expression "means that the authors of the scheme, who were so delighted with a section that they put the rest in hand, are now so taken aback by the reception of their precious scheme that they are as ready to condemn as before to admire. . . . 'Largely' may be taken to mean that the committee hope, by throwing overboard the stencilling, to save the glass ornaments. . . . Either let us have Sir W. Richmond or Sir Christopher Wren. The admirers of either will not be content with a mixture. It will not be necessary to strip off the mosaics in the quarter-domes. These are spaces that might reasonably be treated with mosaic, and a coat of plaster will put them to rights when the subscribers have had their money's worth of pleasure out of them. But all the tinsel and tattoo around and above these is of a piece, and a contradiction of Wren's design, and the glass panels, if left on the jambs of Wren's piers, will continue to taint the architecture. . . . Suppose a man with a love of snappy sentences let loose upon Milton's verse and cutting up his rolling lines into new sections. Thus for

Still in their station all the planets stood.
While the bright pomp ascended jubilant—

we should read

The planets kept their place. They all stood still.
Up went the pomp. It was a gay affair.

If the stopping of Milton's verse, its alternation of continuous and broken lines, is of the essence of his art, so is an architect's use of broken and empty spaces, and to pick little panels out of what Wren left plain is to correct his rhythm in the spirit of the above decoration of Milton. . . . The pledges given by the Dean of St. Paul's and the committee of decoration in the appeal for subscriptions were that 'Sir Christopher Wren's intentions, his mode of treatment, and, as far as they can be authenticated, his very designs will be scrupulously kept sacred and followed'; and 'to prepare carefully digested drawings and models which should be exhibited as publicly as possible.' . . . Are we to take the Dean's words literally, and regard the work now carried out as the promised experimental model?"

The Building Crafts.

The following Address was delivered by the President, Professor Aitchison, R.A., at the opening of the Building Trades Exhibition at Islington on the 26th ult.:—

My Lords, Ladies, and Gentlemen,—We have come here to see the opening of the International Building Trades Exhibition. Most persons will allow that it is an important exhibition, as the mere fact of building, even in so great a capital as London, forces attention to it even while passing in a vehicle; but it is only when we consider the great number of industries that are necessary to it that we can form a true idea of its importance. No building of brick, of stone, or of concrete can be erected without lime or cement, at least in this country, for we read of Babylon being built of bricks and asphalte. Who was the inventor of mortar we do not know, but we know that the pyramids of Gizeh were put together with it. Lime generally involves a quarry from which the limestone has to be extracted, the building of kilns, and the use of firing, carts and horses to draw the lime, and roads to draw it on, the building of carts, the leather and iron work for the horses, and food, clothing, and habitations for the men, and stables and meat for the horses, not to speak of the men and materials required for making the roads. It is to the necessity for limestone and fuel that we owe the destruction of so many temples and other grand classical monuments; and when I tell you that the marble of the Mausoleum was used by the Knights of Rhodes to burn into lime for the repair of the walls of the Castle of Budrum just before it was taken by Solyman the Magnificent, you will not be surprised at the havoc made among the priceless monuments of antiquity mainly from the same causes, the roofs being used for the fuel. Viollet-le-Duc gives a long list of all the trades and occupations that are involved in building, which, to the best of my recollection, fills several pages of his great work. We have come here, however, to see the new inventions, and the new applications of machinery to our craft. This show is more or less useful to everyone, but it is particularly useful to the architects, and I am sure if there are architects here they will bear out my statement of its advantages. The application of machinery to all sorts of productions has been of immense advantage to all those engaged in building, and of course no less useful to those who occupy the buildings that the architect has designed and the builder executed.

I may mention a peculiar use that I have seen one of the modern inventions put to here. The invention is a sheet of wire-work; at the intersection of the wires small pieces of terra-cotta are fixed on. Some of this wire-work I saw had been bent into the shape of a groined roof, and when plastered inside and out it made a very stiff and apparently serviceable roof, and if it only has the incombustible qualities that are claimed for it it will be a very valuable preventive to the destructiveness of fire. There are doubtless hundreds of other serviceable inventions here which may be used by the architect and the builder.

I may mention one application of machinery to joiners' work that I was very grateful for. I once wanted to use some square moulded balusters, and the expense of working these by hand was too great to allow of their use being thought of, but I found an exhibit here that had been worked by machinery, which so much reduced the cost as to enable me to use them.

One of the ancient Roman poets spoke of

> "Dreadful war
> Yoked the red dragons to her iron car";

but the elemental dragons have been yoked by the moderns to the golden car of peace. The ancients used the fall of water to work mills, and the force of wind to propel ships; but just before our time the application of steam had increased our power of production at least a hundredfold. Tennyson, whose poems were published in 1832, spoke of its then last triumphs:

> "In the steamship, in the railway, in the thoughts that shake mankind."

Shortly after we had the electric telegraph, which has rivalled Puck's boast:

> "I'll put a girdle round about the earth in forty minutes."

Electric lighting has come since, which has almost verified the ungallant Welsh saying, that "if ladies were as nimble with their fingers as they are with their tongues they would catch the lightning to light the fire with"; and when we consider the progress of electrical science since the days of Pliny the Elder—who tells us that if you rub a piece of amber on your toga it will attract bits of straw—to our knowledge of it to-day—to the X rays, which have shown us an undreamt-of power—it opens a vista which almost paralyses us to contemplate.

On this occasion we have exhibits of electrical appliances for light. The electric light has made a revolution in the illumination of houses and cities, and enabled us to get effects that were never even dreamt of before; not to speak of the application of electricity as a motive power.

One of the great revolutions that has taken place in my time has been the increased wages of the working class, and now they give the great stimulus to production; but, like other revolutions, it has not been wholly advantageous, for it has been the means of encouraging what I may call the manufacture of rubbish. Up to a comparatively late period England was celebrated for the excellence of its workmanship. English cabinet-work was known abroad for the excellence of its wood and fitting, and for the absence of artistic design; and England, I hope, is still celebrated for the excellence and durability of its machinery. But in some classes of manufacture it is almost impossible to get anything that is really good. There is an insane desire to have things cheap, without regard to their excellence and durability, or even their temporary utility. The bulk of English cabinet-work is very different from what it once was: small fastenings that have the appearance of solid brass bend in your fingers as if they were of lead, while sash-lines and chair-bands are made of some stuff that is scarcely stronger or more durable than tinder. In certain trades there is a counterpoise to this passion for rubbish. In all the things that have to do with health, that are commonly called sanitary appliances, perfection of workmanship is one of the necessities. This is of an immense advantage to the workman and manufacturer; it teaches them to be thorough, careful, and accurate, for the tests which sanitary experts apply instantly discover imperfect workmanship and materials.

Twenty or thirty years or still longer ago I pointed out the enormous advantage it would be in manufacturing towns to have the whole outer faces of their buildings covered with enamelled bricks or enamelled terra-cotta. This is now done with white or pale-coloured bricks when there are questions of light to the premises themselves or to those of their neighbours; but the appearance of such buildings is rather more hideous than when they are built of the ordinary brick. There are ridiculously few buildings of enamelled brickwork or earthenware where any attempt is made to give to them beauty of form and colour. This is due to three causes: to the wretched leasehold system, to the time required, and the accidents to shape and colour inherent in the potter's trade, and to the desire of people to get artistic designs for nothing. As to the advantages: in the first place, dust and soot do not cling so much to a polished face as they do to rough and porous surfaces, and that which does stick may be pretty well removed by the free use of a water-hose; but the thing I wish most to insist upon is the great importance to mankind of beauty both in form and colour. It cannot be supposed that Nature did not know her business, and that her making almost all her works more or less beautiful in form and colour was not of some advantage to man. To me it seems certain that the beauties which pervade the earth, the air, and the ocean were intended for man's purification, solace, and delight; and that in great towns, where Nature is shut out, and where even the sky is obscured by smoke and dust, there must be a necessary lowering of man's intellectual and moral powers, unless those gifted men who can impart beauty are employed to confer those beauties they have culled from Nature on the habitations, the furniture, and the utensils of town people. May I be allowed to draw your attention to the magnificently designed and coloured friezes in the Louvre that were once in Darius's palace at Susa?

The late Charles Garnier, the greatest architect of our time, published in 1869 a book he called *Through the Arts* (*A travers les Arts*), and in that he gave his dream of the beautification of Paris:—

> I picture to myself the day when the tawny tones of gold will mark the monuments and constructions of our Paris; I imagine the warm and harmonious tints which will tremble under our charmed gaze. One will then have renounced those grand right-angled streets, beautiful beyond doubt, but as cold and formal as the etiquette of a noble dowager. The present inflexible regulations will have their period of reaction, and without hurting anybody each man will be able to build his house without making it exactly like his neighbour's. The grounds of cornices will shine with eternal colours, piers will be enriched with sparkling panels, and gilded friezes will run the length of buildings; the monuments will be clothed with marble and enamel, and mosaics will make all in love with movement and colour. This will not be mean or false luxury; it will be opulence, it will be sincerity. The eye, familiarised with all these marvellous tints and brilliancy, will necessitate our costumes being modified and being coloured in their turn; the whole town will be one harmonious reflection of silk and gold.

I think, to take a modern instance, our manufacturers might take a lesson from Wedgwood, who not only took the greatest pains to render his ware excellent, but also used as his designers the most celebrated artists of the day, and for this reason his ware was called for in every part of Europe, and, I expect, may now be found serving its purpose in many out-of-the-way places. When I first went to Italy in 1853 it was quite common to have one's meals served on Wedgwood ware. But Wedgwood was only a tardy imitator of the originators of this traffic, the Egyptians and Phœnicians. Schliemann found some of the blue glazed earthenware of Egypt in Agamemnon's palace at Mycenæ. This ware bothered the translators of Homer, who had no idea of the trade in blue ware, and in the description of Alcinous's palace in the Odyssey, Pope supposes it to be metal—

> " The cornice high
> Blue metals crown in colours of the sky."

And after these great traffickers the artistic Greek exported his vases and other fictile ware, enriched with representations from his poets or from the folk-lore of his country, whose storied jugs, dishes, goblets, and coolers now fill the museums of every civilised country in the world, and are their most cherished possession and their greatest boast.

I have dwelt on this at great length, for I still hope that our country may furnish to the whole world artistic productions which may vie with the works of Flaxman, if they do not equal the superhuman excellence of the Greeks. The saying of John Addington Symonds should be imperishably engraved on the minds of all those who deal in artistic wares: " Nothing is imperishable but high thought, to which art has communicated the indestructible form of beauty."

Fire-resisting Concrete.

The following letter has been received from the Clerk of the London County Council:—

Spring Gardens, S.W.: 18th April 1899.

THE LONDON BUILDING ACT.

SIR,—I send herewith for your information a copy of a resolution passed by the Council at its meeting on Tuesday, the 28th of March last—

" (*a*) That the Council do, in pursuance of the powers vested in it by the second schedule of the London Building Act 1894, approve of the following material as fire-resisting, namely, concrete composed of properly burned coke-breeze, free from dust and organic impurities, and Portland cement, in the following proportions, viz.—five parts by measurement of coke-breeze to one part by measurement of Portland cement, mixed together with clean water to the satisfaction of the district surveyor, when such concrete is used for filling in between the joists of floors, and is filled in to the depth of at least five inches.

(*b*) That notice of such approval of the Council be given to the Royal Institute of British Architects, the Surveyors' Institution, the London Chamber of Commerce (incorporated), the Institute of Builders, and to the district surveyors under the London Building Act 1894, and be also advertised in the leading daily and professional papers."

I am, Sir, your obedient servant,

C. J. STEWART,

Clerk of the Council.

The Secretary of the
Royal Institute of British Architects.

AT a meeting of the Société Centrale des Architectes Français held on the 27th April, Mr. Arthur Cates [*F.*] was elected a Corresponding Member of the Society.

MINUTES. XII.

At the Sixty-fifth Annual General Meeting (the Twelfth General Meeting of the Session), held Monday, 1st May 1899, at 8 p.m., Mr. Edw. A. Gruning, *Vice-President*, in the Chair, with 24 Fellows (including 14 members of the Council), 24 Associates, and 1 Hon. Associate, the Minutes of the Meeting held 10th April 1899 [p. 352] were taken as read and signed as correct.

The decease was announced of Herr J. von Egle, *Hon. Corresponding Member*, of Stuttgart, elected in 1882.

The Secretary announced the results of the Spring Statutory Examination, and read the names and addresses of successful candidates who had been granted by the Council Certificates of Competency to act as District Surveyors in London [p. 374].

The Report of the Council for the official year 1898–99, a copy of which had been previously issued to every member resident in the United Kingdom, having been submitted and taken as read, its adoption was formally moved by the Chairman and seconded by Mr. Ed. W. Mountford [*F.*], whereupon a discussion ensued [see *Appendix*], at the conclusion of which the Meeting

RESOLVED, *nem. con.*, that the Report of the Council for the official year 1898–99 be approved and adopted.

The Secretary read the Report of the Hon. Auditors for the official year, as follows:—

To the Royal Institute of British Architects,—

GENTLEMEN,—We have fulfilled the duty entrusted to us of auditing the accounts of the Institute for the year 1898. Thanks to the order and regularity with which these have been kept, an otherwise onerous task has proved a pleasure, and we have been enabled to accomplish our work both rapidly and carefully. We have examined all the books, accounts, and vouchers, and have verified the several securities, all of which we have found in order and perfectly correct. We have accordingly to report most favourably on the businesslike manner in which the accounts of the Institute have been kept, and our satisfaction with the result of our investigation.

It is very satisfactory to note that the investments during the year amounted to £1,260 17*s.* 11*d.*, which, added to the total investments at the end of 1897 of £4,970 0*s.* 6*d.*, brings up the total amount of the investments of the Institute at the present time to £6,230 18*s.* 5*d.*

We wish to call attention to the net profit on the year's working (*i.e.* the excess of income over expenditure), which amounts to £1,241 9*s.* 10*d.*, and thus shows an increase of £124 18*s.* 9*d.* on the year 1897, which was considered a good financial year for the Institute. Further, the Council have the satisfaction of finding that the estimated balance of £1,000 for 1898 has been exceeded by a sum of £241 9*s.* 10*d.* In regard to this surplus it should be observed that the rent of the Institute has been increased by £175, that the amount paid in salaries shows an increase of nearly £200 (chiefly owing to the Secretary not having been appointed till the half-quarter day in May 1897), and that the necessary repairs have exceeded by £114 the amount expended last year.

We therefore think the Institute may be congratulated on its good financial position.

We trust we may not be exceeding our duty as auditors in suggesting that a certain amount of the profits each year should be invested to form a building fund, so that in course of time the Royal Institute of British Architects may have a building of its own which may be worthy of the honourable position it holds amongst the profession and the public, and may help to beautify London.

We cannot conclude our report without expressing our thanks to the officials of the Institute for the very able and willing service they rendered us in the examination of the accounts.

23rd March 1899. (Signed) { Zeph. King. / Fred. W. Marks.

The lists of attendances of members at the several meetings of the Council and Standing Committees during the official year having been submitted and taken as read [see *Supplement* No. 12], the Council were authorised to appoint Scrutineers to direct the election of the Council and Standing Committees for the ensuing year of office, and report the result thereof to the Business General Meeting of the 12th June.

On the motion of the Hon. Secretary, a vote of thanks was accorded Messrs. Zeph. King [*F.*] and F. W. Marks [*A.*] for their services as Auditors, and briefly responded to by Mr. Zeph. King. On the motion of Mr. J. M. Brydon the same gentlemen were nominated to serve as Auditors for the ensuing year.

With reference to the appointment of the Statutory Board of Examiners, the Chairman having announced that Mr. Francis Chambers, owing to advancing years, wished to retire from the Board, and that Mr. Thomas Blashill had been asked and had expressed his willingness to serve, Mr. Blashill's appointment to the Board was unanimously agreed to, and the other members were reappointed as follows: Messrs. Lewis Angell, Professor Banister Fletcher, Ebenezer Gregg, Fred. Wm. Hugh Hunt, E. B. I'Anson, Professor Kerr, J. Douglass Mathews, Lacy W. Ridge, Professor T. Roger Smith, Benjamin Tabberer, Thomas Henry Watson.

The proceedings then closed, and the Meeting separated at 10 p.m.

APPENDIX.

Discussion on the Annual Report.

The adoption of the Report having been moved and seconded as stated above,

Mr. ARTHUR CATES [*F.*] said the attendance in the room showed that the Report had hardly proved a great attraction for members. It was greatly to be regretted that the Council had not taken advantage of the literary ability of the gentleman sitting in the secretarial chair to dress up the facts and statements in a more graceful and attractive manner than they appeared in the document circulated to members. The Report professed to give information, but the information given was merely particulars, and not information at all. With regard to the most important point for the Institute, namely, the number of its members and its progress onwards in increasing that number, which was most essential for its continued existence and prosperity, the information vouchsafed was that in the course of the year there had been 25 Fellows elected and there were now 612, that there had been 31 Associates elected and there were now 1,003, and one Honorary Associate elected and there were now 47. He had been actuated by a curiosity which perhaps was pardonable, he really thought almost commendable, to look back a few years and see what the numbers were in the past, information which the Council had not vouchsafed to them. He found in 1895 that the Fellows numbered 604; and thus after all the struggle of five years, after all the Fellows Committees, and all the wrangles and discussions that had taken place with regard to the election of Fellows, they had succeeded in 1899 in bringing the total up to 612, an increase of eight Fellows in five years. As regards the Associates the result, perhaps, was a little more satisfactory, but not very much so. In 1896 there were 968 Associates, and in four years that class had been increased by 35, and now numbered 1,003. With regard to Honorary Associates, in 1895 there were 61, and in 1899 only 47. Those figures deserved the most careful consideration of the Council, in order that they might devise some means by which the numbers and strength of the Institute might be increased in a manner befitting the Royal Institute of British Architects, which represented architects not only of these islands of Great Britain and Ireland, but also of all the Dependencies of the Empire. As regards the Examinations, he might have made a good many observations, but he would limit himself to expressing his regret that even there the progress had not been such as might have been hoped. There were 1,098 Probationers, but only 303 Students. There was a remarkable diminution in the number of those who came forward as Students compared to those who came forward as Probationers. He had anticipated a large diminution, but not one so great as that. Coming to those who passed the Final, the contrast was greater still. The most important contrast, however, was with reference to those who came up for the Final and were examined and passed or relegated. Last year, of the 63 who came up for the Final, 31 passed and 32 were relegated. That showed a condition of things which could not be wholesome and could not be right, and one he hoped the executive of the Institute would seek to remedy if they possibly could without in the slightest degree lowering the standard of the Examination. Looking into the details of the last Autumn Final Examination, he found that 33 came up and 17 were relegated, and of those 17 no fewer than 15 were relegated in Design and 9 of them in Mouldings and Ornament. The number of those relegated in other subjects was very trivial. That young architects coming up for an examination of that kind, with the preparation that they should have had, and all of them presumably in good offices, should have been relegated to the extent of nearly one-third in Mouldings and Ornament appeared to him astonishing. It was a point to which the Council should devote considerable attention in order to discover some means of remedying it. As regards the 15 relegated in Design, he was astonished at the number, and sought for the cause. He thought he had discovered it. He would read the subject set for Design —and members would bear in mind that this was a subject given to young men just over twenty-one or twenty-two years of age. "Subject: A general hospital in a large town, on a corner site, with 60 feet frontage to main street facing south, and 110 feet frontage to side street facing west. Entrance to hospital in south front: to out-patients' department in west front. Provide beds for forty patients. Residential medical officer (two rooms), porter, four female servants and eight nurses. Also a common room for latter. Drawings required—three plans, two elevations, and one section to one-eighth inch scale, part of one elevation showing entrance to half-inch scale; and one sketch perspective." And the Students had to do the whole of that in 11½ hours. It might be said that every facility was given to these young men to prepare for it, because the subject was notified to them a few days before the examination. But was it not absolutely monstrous that a subject of that sort should be set for young men little over twenty years of age, without the slightest indication to them of any of the details, and that they in 11½ hours were to cudgel their brains and to worry themselves into devising three plans and making two elevations? No wonder there were failures in Design. The only wonder was that they were not candidates for a lunatic asylum. He said, advisedly, that it was a most regrettable thing that a subject of that kind should be set in those terms and in that way. In the earlier days of the Examinations the rule was for the examiner who took charge of that particular division to draw out and complete the whole of the drawings required, and the question was set from those drawings, and from those drawings sufficient indications were given in the way of general dimensions—dimensions of certain rooms and so on—not in order to hamper the design or the skill of the candidate, but to prevent him from wasting his time uselessly upon solving conundrums which were practically insolvable. Then the subject given was never so formidable as a general hospital. He hoped that that system might be reverted to, and that the gentlemen who were kind enough to take charge of the subject of Design would draw out carefully the subject before they set it, and give some particulars to reduce the mental labour and worry imposed upon the candidates, which led to so many of them failing. Coming to other matters, he should like to ask two questions. One of them related to the Teaching University for London. The Institute was represented before the Gresham Commission, and considerable evidence was given and appendices of considerable length were supplied showing the desirability of establishing a Faculty of Architecture in the new Teaching University. The efforts made by the Institute received considerable approval by the members of that Commission, and they made recommendations which would have placed the Institute and the profession of architecture in the position it ought to occupy among the other learned professions of the Empire. But unfortunately architecture did not command that esteem in the public mind which it should, and when the propositions of the Gresham Commission were revised, architecture was put lower down, and in the scheme propounded for the Teaching University it did not occupy its due position. Deputations waited upon the Lord President of the Council urging upon him and upon the Government the necessity of taking steps to put into operation the recommendations of the Gresham Commission. Unfortunately, by some mischance the gentlemen who represented the Institute on that occasion only went in as ordinary members of the crowd, and were thus precluded from taking any part in the discussion or from urging the claims of Architecture in the same way as the claims of Engineering were urged by the President of the Institution of Civil Engineers. As the result of those deputations and of the pressure brought to bear by other quarters upon the Government, an Act was passed constituting a Statutory Commission which was to draw up the programme of the University, to establish the Faculties, and generally to take all the necessary steps for the founding of the Teaching University. He had reason to believe that considerable progress had been made with the question of those Faculties, and he wished to ask what steps the Institute had taken with respect to its being represented before that Commission, and with respect to the position that Architecture should hold in the Teaching University.

The CHAIRMAN replied that early in the year a letter was written to the Registrar urging that the Commissioners should receive a deputation who should lay the claims of architecture before the Commissioners. The reply was that the letter would be laid before the Commissioners when the time came for them to decide upon the question. Nothing further had been done.

Mr. CATES, continuing, said that the Act was passed in the summer of the year before last. The secretary to the Commission went on a tour on the Continent in order to collect information with respect to the teaching universities, and he was open to receive communications from the Institute or from any other body upon the subject. Only a communication of the indefinite character referred to by the Chairman had been made, and nothing further had been done; and he presumed that the result would be that Architecture would be shunted in the same manner as it had been shunted before, and would probably be put in as an appendage to Civil Engineering. The time spent in laying the claims of Architecture before the Gresham Commission would be wasted. He had written a letter pointing out how urgent it was that effective measures should be taken to put the claims of Architecture before the Commission, but practically nothing had been done. Then there was another point. A new university was about to be established in Birmingham. The Institute had held a meeting and dinner at Birmingham at the very time, within a fortnight of the programme for that university being published. Were any steps taken at that meeting to collect the views of the Birmingham architects upon the subject and urge upon them the importance and necessity of getting Architecture recognised as a distinct faculty?

The CHAIRMAN said he understood that the Birmingham Association did not seem very anxious on the subject.

Mr. CATES: Then they should have been made anxious; they should have had the matter pointed out to them. If they were sluggish, they should have been woke up; and if they did not take steps the Institute should have done so, and let the Birmingham people follow behind. It was really a matter of great importance. If some members of the Council would make themselves acquainted with what had been done in America at the present time with regard to architecture—they had the reports sent from the Massachusetts Institute, the Columbia College, the Pennsylvania College, and others; they had the programmes of these institutions and their whole system of education close under their eye—if they would study these, they would see what was being done in America. The time would come, if they continued sluggish and dullards as they were now, when their young men would go to America to learn that architecture which they ought to be able to acquire at home. Then there was another point which was of very vital importance to the public and to the profession practising in London—viz. the London Government Bill. In the Council's Report he found it mentioned twice. It was mentioned on page 45 in the Report of the Practice Standing Committee: "The Committee have considered the London Government Bill and reported thereon to the Council." Then on page 41 occurred the passage: "The Council have taken public action with regard to the New Vauxhall Bridge and the London Government Bill." What had that action been? They had seen printed a letter addressed to the Government upon the subject. Had any other action been taken? Had any reply been received? If the Council were desirous of following up the course indicated in that letter, had they taken such steps as would secure the moving of the proper amendments in the House, and would secure the support of those amendments by a sufficient force of opinion in the House to enable the interests which they were supposed to protect to be protected?

The CHAIRMAN said that, with regard to the London Government Bill, an arrangement had been made for a deputation from the Council of the Institute to see Mr. Balfour at the same time that he would be seen by the members of the District Surveyors' Association. Copies of the letter referred to by Mr. Cates had been sent to Members of Parliament; and a member of the House of Commons, who sympathised with the architects' views, had undertaken to look after the proper representation of the Institute when the Bill came up for discussion in Committee.

Mr. WM. WOODWARD [*A.*] said that the Report of the Council was absolutely barren. That had to some extent been indicated by Mr. Cates with regard to the London Government Bill, but he should proceed to further justify the term "barren" which he had applied to it. With regard to the financial statement, he had made some slight comparison between the finances of 1898 and the previous years. He noted an increase of £192 in the salaries, and contended that the Report should state to whom extra salaries had been granted.

The SECRETARY asked to be allowed to state that the matter was referred to and explained in the Auditors' report, which would presently be read.

Mr. WOODWARD said if he had seen the Auditors' report he should not have mentioned the matter. If the Auditors' report was of any value at all it ought to accompany the financial statement, and be issued to members with the Annual Report. He would suggest that in future, if there were an Auditors' report, it should accompany the Report of the Council. The total income to December 1897 was 6,189*l.*, and to 31st December 1898 it was 6,592*l.*, or an addition of about 415*l.* That was satisfactory, and it was equally satisfactory to know that over 1,000*l.* had been invested, forming, he hoped, a fund for providing the Institute with a building worthy of the position which Architecture now held in the public estimation. Touching one or two items in the expenditure account, he noted that the Kalendar cost 8*l.* 4*s.* 3*d.* to send out in 1897, and 22*l.* 7*s.* in 1898, an addition of 14*l.* [The CHAIRMAN explained that the excess was mainly owing to the extra cost of packing and postage, due to the large increase of advertisements, which added to the bulk of the volume.] Then under the head of "miscellaneous expenses," there was the sum of 10*l.* for the translation of Professor Ussing's pamphlet. He did not know who Professor Ussing was, or what the pamphlet was about. That was a piece of information the Annual Report might have given. [The CHAIRMAN said he must refer the speaker to the Journal, where full particulars would be found.] Then there was the sum of 11*l.* for "frame for portrait." They were not told whose portrait it was. If it was of their last President, could it not have been stated in the Report? Then he might refer to page 41, where the Council announced that since the 31st December they had been enabled to invest 1,500*l.* The year was not mentioned, and one could only assume that the sum was invested since 31st December 1898. [The CHAIRMAN intimated that such was the case.] Then the year should have been put in the report. Coming to the extraordinary document which they termed the Report of the Council, he would direct attention at once to page 41, to the paragraph which said: "The Council have taken public action with regard to the New Vauxhall Bridge and the London Government Bill." With regard to the New Vauxhall Bridge, he would repeat what he had said about the previous action of the Council on other matters. The observations of the Council, transmitted to the Government or to the London County Council, were interpreted by those bodies to come from the Royal Institute of British Architects as a body. As a matter of fact it was nothing of the kind. Whether members agreed or disagreed with the action of the Institute with regard to Vauxhall Bridge; whether they agreed or disagreed with the letter Mr. Waterhouse and Mr. Mountford had written to Sir Alexander Binnie, which they apparently afterwards regretted; whether they agreed to granite or stone, he contended that, without some information being given to the Institute of the action taken by those committees, it should be very clearly laid down that those views, whether right or wrong, represented not the 1500 members of the Institute, but of the few gentlemen more or less acquainted with the subject upon which they had ventured to dictate to those public bodies, to Parliament, and to the London County Council. [The CHAIRMAN, replying, said that it was impossible to bring those matters before the general body in time to obtain its opinion so as to be of any use when matters were urgent. The Council were elected by the general body to act on behalf of the Institute, and he thought that when they had taken action the general body should back them up.] On the same page they were told: "The Competitions Committee had had several meetings, and action had been taken with regard to the following competitions," and then several competitions were mentioned. But nothing more. There was not one single word with regard to the London Government Bill and the New Vauxhall Bridge, informing members of the action which had been taken. The Council had said that it would be an advantage to consult members as to the various matters dealt with by the Council, but why should not their Annual Report tell members what action had been taken with regard to the competitions referred to? [The CHAIRMAN said that in very many cases they could not have published the details of the action they had taken with regard to competitions without rendering themselves liable to actions for libel.] At the bottom of page 41 they were informed that "At the request of the Court of Common Council of the City of London the Council have nominated six architects to send in designs for the new Sessions House, Old Bailey." That was one of the plums which he was very happy to think fell to the lot of the Council; but could not the Council have told them the names of those six architects who had been nominated to prepare the designs for the Old Bailey? [The CHAIRMAN believed it was a matter of public knowledge who those architects were.] He (Mr. Woodward) did not know them; and if it were a matter of public knowledge, why should it not have been printed in the Journal? Coming to page 42, the report of the Art Standing Committee always filled him with amusement. The first paragraph said: "Plans and particulars of proposed additions to St. Patrick's Cathedral, Dublin, were submitted to your Committee." It was not stated by whom the plans were submitted. But the concluding lines of the paragraph were somewhat startling: "Your Committee determined that assuming additional accommodation to be necessary for the efficient performance of the services of the Cathedral it would be legitimate and reasonable to provide it." If that did not make one proud of membership of the Royal Institute of British Architects he did not know what would! Then with regard to Kew Bridge, the Committee "urgently recommended the adoption of granite or stone as the material for the bridge." The report did not state that any other material was proposed. It went on: "The Secretary wrote to the County Councils of Middlesex and Surrey conveying this recommendation," and "in reply the Institute was informed that stone would be used." In order to make this paragraph of any use at all the writer should have said that it had been proposed that the bridge should be built of something; but nothing of the kind was said, and one could only assume that it was intended to build it of stone, and they had simply got what was intended. Then at the end of the paragraph "Historic Buildings in London" it is stated that "the Conference determined to prepare a register of all buildings of architectural or historic interest in the County of London, and a committee was appointed, of which the Hon. Secretary of the committee is a member." But there were two Hon. Secretaries of the Committee, Mr. Mountford and Mr. Owen Fleming—probably they would settle among themselves which was *the* Hon. Secretary of the Committee. In the next paragraph he observed that the Institute had been meddling, as usual, with matters which had far better be meddled with by Italian architects than by members of this Institute—"Florentine Monuments." He remembered that, some years ago, "Ouida" the novelist wrote a stinging letter to *The Times* on the demolition of the central part of Florence. He happened to be in that city at the time, and he called upon the engineer, who showed him his plans. He then visited the centre which was proposed to be demolished, and he found it consisted of buildings certainly not exceeding two hundred years old, and that it was an absolute fever den, causing numerous deaths. "Ouida" said that if that place were destroyed it would mean the destruction of archæological interests, and so on. It would have been much better if the Royal Institute of British Architects had confined themselves to improving their own monuments; and when they had done that it would be time to dictate to the Florentine architects. Then there was another paragraph —"Decoration of St. Paul's Cathedral. This matter is engaging the attention of your Committee." Everything seemed to be engaging the attention of the Committee, but they did not see the result of that attention. He saw by the public prints that a deputation from the Institute waited upon the Dean. He should like to know who composed that deputation, who instructed it to go, and what was the result. [THE CHAIRMAN stated that the Report was printed before the deputation saw the Dean. A minute of the interview would be given in the next number of the JOURNAL.] Then there came this paragraph: "The following subjects have also received the consideration of the Committee:—Portrait of Sir William Chambers, &c." And that concluded the Report of the Art Standing Committee. Not one word was said about those things. This brought him to the Report of the Practice Standing Committee, which said: "The points raised on the Institute Conditions of Contract referred to in the last Report, and also other important questions on these Conditions referred to the Committee by the Council, were very fully considered and reports thereon sent to the Council." Why should not members have those reports? They were of extreme importance to those who took part in the discussion, and to those who knew that those conditions of contract were not signed by the best builders in London, and would not be signed until they were entirely altered. [THE CHAIRMAN replied that the matter was still under consideration. A committee of the Council was in communication with a committee of the Institute of Builders, and endeavouring to bring their mutual ideas upon these contracts into line, with a view to satisfactory agreement. Nothing was reported, because the negotiations were not completed.]

MR. WOODWARD, continuing, said he was glad to hear the Chairman's statement. The concluding paragraph of the Practice Committee's report stated: "The Committee have considered the London Government Bill, and reported thereon to the Council." That report should have been communicated to members. [THE CHAIRMAN: The report was incorporated in the letter which had appeared in the JOURNAL.] With regard to the Science Committee's reference to the publication of the results of the brickwork experiments, he supposed that by the time their sons had become old men the results of those experiments would be published. He was sorry to see the letter which the Council had addressed to Mr. Max Clarke after the trouble he had taken in the matter, and the enormous amount of time he had spent upon it. The letter, as printed in the JOURNAL, gave him permission to publish the results, on condition that he did not mention the name of the Institute in connection with the experiments. That was a most extraordinary proceeding for the Royal Institute of British Architects, who had initiated those proceedings, and led the Committee to take so much trouble. Finally, he had one general observation to make. He had spoken of what the Council had not done; might he venture to say what he thought the Council might have done? If this had been an active Council, useful to the profession at large, they might have said something about light and air. He was quite aware that the subject had been brought before the Institute on many occasions; but what had not been before the Institute, and what had not received the attention it might have received from the hands of the Council was this, that there was decidedly growing up on the part of many architects and surveyors practising in London a system of blackmailing—there was no other word for it—their fellow architects. There were men who got their living by pressing forward threats of legal action, pressing forward requisitions for money, and, in fact, performing actions which certainly were not worthy of members of an honourable profession. He trusted the subject would meet with the attention of the Council. Then, so far as he knew, the Council had taken no active measures with regard to the Birmingham Meeting. He attended that meeting, and the Chairman promised that the subject of Local Administration of Building By-laws should receive the Council's consideration. He knew it had received some sort of consideration, but they did not press it forward; they let the time elapse until it was too late. There was another matter which he thought might engage the attention of the Council, and that was the speech made by the Lord Chief Justice on Secret Commissions. Lord Russell, he believed, specifically referred to architects as men who were in the habit of dealing with these secret commissions. He was not speaking of anything that was not tolerably well known to members of the profession when he stated that there were many architects who made a practice of accepting commissions from tradesmen whom they engaged to carry out their works. There were many members of the profession who indulged in secret practices—members even of the Institute.

THE CHAIRMAN said that if Mr. Woodward knew this to be the fact, it was his duty to bring their names forward.

MR. WOODWARD said that by so doing he would lay himself open to an action for libel! It was a thing which was perfectly well known.

THE CHAIRMAN said that a statement to the discredit of a generally honourable body of men ought not to be made without some substantiation. It would not bring him (Mr. Woodward) within the scope of an action for libel if his statements were true and could be proved.

MR. WOODWARD: It could not be proved, because the tradesmen would not divulge it, as it was against their interests. But if that was the view of the general body of the Institute, let the Institute address a letter to the Lord Chief Justice.

THE CHAIRMAN stated that that had been done by the Council at their Meeting that afternoon.

MR. WOODWARD, continuing, said that there was another matter. With regard to competitions—he had never heard a single instance in which the Institute had helped young men who suffered from—he would not say fraud—but, at any rate, improper dealings of committees with regard to competitions. If the Institute could take some legal action he thought it would be of great service.

THE CHAIRMAN remarked that the Council had often taken action. It had not been necessary to take legal action. They had been able to manage the matter without that.

MR. WOODWARD: There was one other matter he thought the Report might have mentioned. It was somewhat curious that there were present at that meeting three gentlemen—Mr. Arthur Cates, Mr. Charles Fowler, and Mr. Thomas Blashill—who had left the ranks of active men—who had done a great deal of work in their way for the architecture of London, and who now resigned themselves to, he hoped, many years of quiet enjoyment as some recompense for the activity they had displayed. He thought the Report of the Council might very well have referred to those gentlemen. Concluding, he hoped the Council would be a little more active, and in their next report would cease to adopt the method of stating that they had taken action without informing them what action they had taken.

MR. H. HARDWICKE LANGSTON [*A.*] asked for an explanation of the item in the accounts "Advertisements in newspapers."

THE CHAIRMAN stated that it referred to advertised announcements of Examinations and the annual exhibition.

MR. LANGSTON wished to call attention to announcements of meetings of the Institute in the calendar of daily papers, under the heading of "To-day." Some of these announcements simply read "Architects' meeting, 8 P.M." Either the papers might be informed that the Institute did not require gratuitous notice of their meeting, or if they were kind enough to give it notice, they might at least give the Institute its proper name. There were other societies of architects, and the announcement, worded as he had mentioned, did not convey to the public that the Institute was intended.

THE CHAIRMAN said that endeavour had been made to get the name of the Institute correctly given in such cases, but they had, of course, no control over the papers.

Mr. J. DOUGLASS MATHEWS [*F.*] asked if Mr. Balfour had agreed to receive a deputation from the Institute on the London Government Bill.

The CHAIRMAN said that he had not agreed to do so, but arrangements had been made for a deputation on behalf of the Council to wait upon him at the same time as the deputation from the District Surveyors' Association, and, of course, in unison with them. They had the same objects in view.

Mr. MATHEWS said that the District Surveyors had no appointment with Mr. Balfour. He understood that the letter on the Bill had been circulated to all Members of Parliament, but he did not think there had been any resolution proposed, and no Member had been asked to take charge of it.

The SECRETARY stated that Mr. A. W. Soames, Member for South Norfolk, who was the only architect in the House of Commons, had volunteered his services to the Institute. There was no amendment down in his name, but a letter had been received from Mr. Soames stating that there were three amendments down by other Members, and that he would support them. The amendment was with regard to the elimination of Clause 6.

Mr. MATHEWS thought it very desirable that the Institute should be represented not simply by one Member, especially as he was not a member of the Institute. They ought to get some member of the Council to take the matter up and push it forward. The District Surveyors' Association were taking action, but though the objects were to a certain extent identical, yet they looked at the matter from a different point of view. He had seen several Members of the House of Commons upon it, and they seemed very much impressed by the Report and the position of the Institute. He thought, therefore, that the Institute should do all it possibly could to get Members of the House generally to interest themselves in it and support it when the time came. The Practice Committee endeavoured as far as possible to consider the matter purely from the architectural point of view. The District Surveyors looked at the matter not merely from the public point of view, but also from that of their own private interests.

Mr. EDWIN T. HALL [*F.*] said he had seen in the papers lately that the Church of St. Mary Woolnoth was to be pulled down. The Institute had taken a very active interest in saving it at the time the Underground Railway came there, and as a result it was decided that it should not be removed, but that the station should be erected underneath it, and that had been done. He was told, however, that the Bishop of London had agreed to the amalgamation of that parish with another and to the removal of the church. He hoped the Institute would take the same active course which they had taken before, so that they might have in that big open space some evidence of Christianity, where the god Mammon was so keenly worshipped. It would be a lamentable thing from an architectural point of view if the church were removed from that site, and he sincerely hoped the voice of the Institute would be heard against it.

The CHAIRMAN said that from his own personal knowledge he could say that the interior of St. Mary Woolnoth was being refitted and restored at the present moment. He had not heard a single word about its proposed removal. The Council would make inquiry about it, and take action in the matter if there were any truth in the report.

In reply to Mr. Hall as to what was being done with regard to the Secret Commissions Bill, the Chairman stated that the matter had been very carefully considered by the Council that afternoon. A letter was to be addressed by the Council to the Lord Chief Justice, enclosing copies of the declarations made by members of the Institute, and offering to come forward and give evidence, and do everything in their power to support his Bill.

Mr. HALL, referring to the London Government Bill, asked whether the Institute were merely going in at the tail of the District Surveyors' Association, or had the Government been asked to receive a deputation from the Institute.

The CHAIRMAN replied that a separate deputation would go from the Institute, and the Council would press the question so that the Institute might be heard.

Mr. HALL then referred to the advertisement of the Institute publications on page 38 of the *Supplement* containing the Report. Only a part of the publications were there given. This was a mistake, and misleading. They should all be advertised together. They were a great source of profit. He was informed that last year as many as 2,750 copies of the form of building contract were sold. The new Scale of Charges should be added, and he should be glad to receive a copy, as he had not seen one yet. [The CHAIRMAN stated that a copy had been forwarded with the Journal to every member of the Institute.] Mr. Hall, continuing, said that, with reference to Mr. Woodward's criticism of the action of the Council, he would respectfully suggest to the Meeting that it was their duty to encourage the Council to take action as frequently as they thought right. They were the elected representative body of the Institute, and the more active they were—always presupposing that they gave careful consideration to the action they took—the greater would be the service they would render the public and the Institute. Therefore they should act at once, and not wait to bring matters before the General Meetings. The Council were to be cordially congratulated on the appointment of the two architects for the Government buildings. The Government had shown that deference and respect to the Institute which ought to be shown, and all would agree that no better appointments could have been made than Messrs. Brydon and Young for those important buildings.

Mr. C. H. BRODIE [*A.*] wished to support Mr. Hall in his remarks as to the action of the Council on public questions. There was no more satisfactory portion of the report than that which indicated that the Council was moving in public matters, that they were being listened to, and, more than that, that the Council were being asked to nominate architects for important public buildings. With regard to the paragraph stating that "The Council have taken public action with regard to the new Vauxhall Bridge and the London Government Bill," he thought that statement would have been more just and more satisfactory if the words "At the suggestion of the Art and Practice Standing Committees respectively" had been added. In sending a communication to the public Press such as that letter on the London Government Bill, it was of course only right that it should go as from the Council of the Institute; but he could not help thinking that in the last issue of the Journal, where the letter appeared, it should have been stated that the letter was the suggestion, almost in its entirety, of the Practice Standing Committee. That Committee had given a large amount of time to the matter, and he thought, in justice to the Committee and in common fairness, that work should be noticed. On page 45 there was a paragraph in the Science Committee's report as to the publication of the results of the brickwork tests as to which he had already made some remarks at a previous meeting. The excuse offered by the Hon. Secretary for the non-action of the Council was that Professor Unwin had stated that those reports were not reliable, or words to that effect. Since that time his attention had been called to a book published by Professor Unwin. Letters had also appeared in the last number of the Journal in which Mr. Max Clarke was informed officially by the Council that he might publish the results of those tests, provided the name of the Institute was not mentioned. He agreed with Mr. Woodward that that suggestion was a ridiculous one, and it was at least funny to notice that on page 413 of Professor Unwin's book, only just published, there was the heading "Tests of Brick Piers by a Committee of the Institute of British Architects." Professor Unwin could make use of those tests in a book of his own, but the Council would not allow them to be referred to as Institute tests by a member of the Institute Committee which made them. The Council had refused, until they were requested to do so by a General Meeting of the Institute, to publish those tests in a get-at-able and convenient form instead of being spread through sundry numbers of the Journal. They refused to publish them, but Professor Unwin did so. He should say, looking at that book, that the Council had been "bluffed."

Mr. OWEN FLEMING [*A.*] asked if the Council contemplated taking any action with regard to the Paris Exhibition, either in the way of representation of buildings or in some other way, or whether there was any idea of organising an official visit of the Institute to Paris.

The CHAIRMAN said that no special action had been taken by the Council up to the present, but the Institute was represented on the Prince of Wales's Committee by the President, who would bring whatever was necessary to their notice, and action would then be taken.

Mr. FLEMING explained that he was speaking of a visit of the Institute as a whole to the Exhibition. If there was anything of the kind contemplated, the Council ought to get in communication with the Societies.

Mr. MATT. GARBUTT [*A.*] asked whether Professor Unwin had stated in his book that the results of the brickwork experiments were unreliable. If not, he should like to know whether the Council were now prepared to go ahead and publish the results.

Mr. BRODIE said there was no intimation whatever in the book that they were unreliable.

Mr. JOHN SLATER [*F.*], referring to Mr. Cates's remarks on the Examinations, said it was a matter of regret to all members of the Board of Examiners, as well as to all members of the Institute, that the number of failures had been so many in recent examinations. They were bound, however, not to lower the standard of the Examinations in the interests of those who had already passed. The Institute, unfortunately, had nothing whatever to do with education, and they were only able to examine students in the knowledge they had obtained in other places. He was perfectly willing to admit, as regarded the subject of Design, to which Mr. Cates alluded so caustically, that it was a mistake the Board of Examiners would take care was never repeated. Unfortunately, they were not, as a body, infallible, and they occasionally made mistakes. It was felt afterwards that that subject had not been sufficiently considered when it was given, and he hoped that no such subject would be given again. But with regard to the failures, they were bound to keep up the standard. He hoped that at the next examination—and he was happy to hear the number of candidates was very considerable—a much larger proportion of candidates would pass. As to what fell from Mr. Woodward about Professor Ussing's pamphlet on Vitruvius, he was afraid very few members of the Institute were able to appreciate that pamphlet. But he would like to say that it was on the strong representation of the President that the paper was published. He had heard, quite casually, from a man, not an architect, who was a leading classical scholar in this country, that he had read the paper with the greatest interest, and that he considered it one of the most important communications on the subject of Vitruvius which had recently been published.

Mr. E. W. HUDSON [*A.*], referring to the paragraph about the Florentine monuments, said that the memorial against their demolition had been largely signed by members of the Institute. Mr. Woodward appeared to think it was somewhat of an impertinence for members to say anything on the matter. He protested against that. If they had to consider the feelings of everybody in doing an action they felt to be right, he was afraid very little would be done towards saving threatened monuments. He wished that some civilised or uncivilised individuals who were in power had raised their voices to save some of our own monuments which had been ruthlessly, wantonly, and ignorantly destroyed, especially at the beginning of this century, when some English cathedrals suffered terribly at the hands of the—not restorers, but destroyers. He hoped that this would be a precedent, and that when anything of the kind occurred again the voice of the Institute would be heard in protest. He was surprised to hear Mr. Woodward limit the interest of buildings to those more than two hundred years old. Thirty years ago he might have agreed with Mr. Woodward, when he (the speaker) believed there was no salvation outside fourteenth-century Gothic, but he had altered his opinion since then, and if they did not take care of monuments which were less than two hundred years old, they would be doing an injustice to those who came after them.

The CHAIRMAN said he would endeavour to answer the questions not already answered as shortly as possible. All were glad to see their old friend Mr. Arthur Cates back again, to see the active interest he still took in their concerns; and, though his criticism had been sharp, everybody knew that it was well intentioned, and that the Council could not do better than pay the closest attention to any remarks that fell from his lips. He could promise that his views should be represented to the Council, and well considered, and he hoped also by the Board of Examiners. The unfortunate fiasco on the subject of Design had been a matter of great regret to the Council and everybody connected with the Examinations. No doubt it had thrown back men who ought to have passed. They could only hope that these candidates would come up again and pass among another batch. The question raised about blackmailing in cases of Light and Air was unfortunately only too familiar to practising architects, particularly in the City. How to remedy it he did not know, except by treating those who brought that class of action as they deserved to be treated in the ordinary course of practice. Of course, if they overstepped the bounds of honesty there was a remedy both outside the Institute and in the Institute itself, but they were rarely so stupid as to leave the means of getting at them in that way. But a great deal could be done by those who understood the business in outwitting them in the conduct of the actions which ensued. He had devoted a great deal of his energy and intelligence to that purpose for many years past. With regard to the supposed retirement of the three gentlemen mentioned by Mr. Woodward, he thought Mr. Woodward's statement somewhat premature. They were all in good health, and, although they might have abdicated some of their official positions, they had not entirely given up the active practice of their profession, and he hoped they would remain for many years active members of the Institute.

The Chairman concluded by putting the motion for the adoption of the report, which was carried unanimously.

Mr. J. M. BRYDON [*F.*] briefly referred to the report of the deputation to the Dean of St. Paul's (p. 375). The deputation had impressed upon the Dean the mistake that was being made, and the Dean distinctly said that a great deal of the work was experimental, and that, at all events, the stencilling would be stopped. They hoped for a great deal more than that; but as negotiations were still proceeding, it would not be wise to say what had been done or how far they had got. He thought, at all events, that the decoration in the dome would not be carried any further.

THE ARCHITECTURAL ELEMENT IN ENGINEERING WORKS.

By H. Heathcote Statham [*F.*].

Read before the Royal Institute of British Architects, Monday, 15th May 1899.

I HOPE no member of this Institute supposes for a moment that this paper, although a comment on engineering works from an architect's point of view, is intended in any sense as an attack on the engineering profession. So far from entertaining any such intention, or having any feelings which could prompt me to it, it seems to me that in the century which is just drawing to a close engineers have played a far more important part in the world than architects. This is partly, no doubt, owing to circumstances not altogether within their own control, but which they have turned to splendid account. The enormous development of locomotion by means of steam power, which will be remembered in history as the great characteristic of the present century, has led to a demand for immense constructional works all over the world for the crossing of rivers, valleys, and estuaries—not to speak of the variety of other works unconnected with the railway system, some of them (such as reservoirs) on a very large scale—which has furnished the engineering profession with opportunities such as the profession ("or art"—*infandum renovare dolorem*) of architecture has not enjoyed since the era when the mediæval cathedrals were built. The viaduct, we may say, is to the nineteenth century what the cathedral was to the twelfth, thirteenth, and fourteenth centuries. The public want great engineering works, and are willing to pay liberally for them. They do not want great architectural works at present—they do not, in fact, want architecture at all; and if there are circumstances in which it is to some extent forced upon them, they at all events grudge paying for it, and try to scamp it as much as possible. Moreover, the engineers have one great advantage over us, that in regard to everything within the proper limits of their own profession (I use that phrase advisedly) they know exactly what they want, and I am afraid it must be admitted that we do not; at least, if we are all agreed that we want to produce artistic beauty in building, we are by no means agreed as to the best path to pursue towards that desired end. But I do not believe this is altogether our own fault. What is at the bottom of it is that there is no great public want or ambition for great architecture to pull us along. As Lord Leighton said, speaking at the Liverpool Art Congress, "What the public want, that they will have." During the greater part of this century the public have wanted great works in engineering, and the want has evolved great engineers. There may be a change, a reaction from this phase, perhaps before very long. The engineers may possibly even now be getting near the end of their tether. But, at all events, if a time arrives again when the mass of the people really want and long after great architecture as a possession to be coveted and prized, there will then again be great architects and a great style of architecture.

It has been argued by some people of late that in fact the professions of architecture and engineering are the same thing, that they never ought to have been disunited, and that they never were until modern times; that the object of each is construction of some kind, and that all construction, besides being sound and scientific, ought to be beautiful as far as it can be made so. There is a certain truth in this, but it must not be pushed too far, either in regard to present circumstances or past history. It may be admitted that there are a good many cases in which you cannot draw the line very easily between architecture and engineering, in which the work might be classed in either category, and might be carried out by either an architect or an engineer. There are, for example, the smaller class of bridges for ordinary traffic, and which do not involve large operations on specially constructed foundations in the bed of a river, such as need the special training and experience which engineers have had in that sort of work. There is no reason why a bridge of that kind should not be built by an architect just as well, in regard to practical construction, as by an engineer; in fact, I have put up on the screen here an illustration of a small stone bridge designed by Mr. Ernest George, and which some of you may have already seen; a charming work in an architectural sense, and which presents nothing in its construction out of the way of an architect's knowledge and experience. I draw a distinction, even in regard to small works, between bridges for common use and those for railway traffic, because, in regard to the latter, there are special questions to be considered in regard to the formation of the roadway, the weight of trains, and the effect of impact of a rapidly moving load, &c., which are outside an architect's experience. But when we get away from this border line occupied by works which might be classed in either category, we come, in opposite directions, to works which have an essential distinction, and which may be classed respectively as purely architectural or purely engineering. The distinction may be defined thus: architectural works are those in which, though they may be based on utilitarian requirements (as in fact every building is, except monuments or triumphal arches), the consideration of architectural effect and artistic expression is an important element. Engineering works are those in which considerations of structural fitness and economy of material are obviously and necessarily paramount, and in which, in many cases at all events, decorative treatment would seem an impertinence (in the Latin sense of the word) and out of place. As examples on the one side we may place a church, a mansion, a town hall; on the other side such a structure as a large railway viaduct.

The question of economy of material, just touched upon, has a good deal to do with the distinction. Architecture in her highest efforts, it may be said, disdains economy of material; one of the elements of monumental expression, in fact, consists in redundance of material—the highest architectural effect is hardly to be realised without it. Pure engineering, on the other hand, aims at economy of material, not only because, in the case of railway companies, the dividends have to be considered, but also because, in works on a large scale, the main problem is to secure the greatest strength with the least weight; the weight of the material itself, in bridging a great span, being the greatest difficulty to contend with. In the Forth Bridge, for example, the weight of the train is almost a trivial matter; the business was to make the structure carry its own weight; that once done, the train is a mere fly upon the wheel, so to speak. In such a structure every pound of material that is not doing work is, *pro tanto,* matter in the wrong place. And that is really, perhaps, one of the most important of the distinctions between engineering and architecture. An architect loves mass and weight of material for its own sake, for its effect in giving monumental character; an engineer, when confining himself to pure engineering, wants no material that is not necessary for structural stability.

As to the historic view of the matter, the assertion that the division of builders into architects and engineers is only a modern one, that also seems to be an exaggeration. In the Renaissance period, it is true, one man did all kinds of things, and we find a great painter acting as military engineer, devising instruments of war, and planning fortifications. But it does not seem to have been so with the Romans. Roman architects could not do without the column and entablature, even where it was used only as a decoration in a construction essentially arched. The man who designed the Colosseum stuck orders in parallel ranges all over it, and would certainly not have been satisfied without them ; nor probably would his public have been satisfied—they would have thought their great theatre had a mean appearance. But this was not the case with those purely utilitarian works, the aqueducts. There they dispensed with the otherwise universal columnar order ; the aqueducts were merely tiers of arched construction, with perhaps a plain impost moulding. Their weather-worn remains look picturesque to us now, but they were not picturesque to the men who built them ; they had, I feel certain, no more sentiment about such a structure than a modern engineer has about a lattice girder. It was the best practical method in those days of carrying a high-level water conduit, and was probably carried out by a different set of men from those who designed the temples and theatres.

Engineering works properly so called, therefore, are those in which structural and practical requirements alone are taken into account, without any special consideration of æsthetics or any special effort at what may be called architectural effect. An immense number of such structures have been erected all over the civilised world during the present century, and many persons, artists especially, have been either mournful or indignant over this, and have complained that the world is getting covered with structures which have no beauty. I have not much sympathy with this constant depreciation of engineers and their works, and consider it to be very much exaggerated. What I think is the real mistake of modern engineers is a point I am coming to presently. But in regard to a large proportion of the purely utilitarian structures which have been erected by engineers, I hold that there is a great deal more of interest in them than many of those who complain of them are able to perceive. That the intellectual interest of works of pure architecture is of a higher kind than belongs to anything connected with mere engineering I should certainly maintain. But structure is in itself a subject of great interest, and those who can find nothing to admire in a great piece of construction devised to overcome a practical obstacle to intercommunication or locomotion give evidence not so much of a superior as of a one-sided education. We hear about railways spoiling the country ; in fact, if we are to believe Ruskin, the railway system is the curse of modern life, the destroyer of scenery, and so on. No doubt a railway in process of making causes a temporary disfigurement to the neighbourhood ; so does the formation of a new street. But after it is once completed, the cases in which it has really spoiled the landscape are not, at all events, very numerous. In fact, it may often be said to have added a new element of the picturesque, a new interest in the scene, so long as the structures connected with it are frankly and simply designed to meet the practical necessities of the case. In a general way, it may be said that it is the attempt to make them "ornamental," in the popular sense of the word, which spoils them. A locomotive engine of the highest class, a giant of power and speed, yet finished, as Robert Stephenson said, "like a watch," is to my mind one of the most stately and impressive objects ever produced by human hands. Would it be improved in appearance or in effectiveness by anything in the shape of what is generally called "ornamental" treatment—by scrolls or floral ornaments worked upon it, for instance? Any such bedizenment, foreign to its practical purpose, would only interfere with the impressiveness derived from its fitness for its great tasks.

Then in regard to statical structures, it may be said that you can hardly design a structure to overcome a great natural obstacle, or to resist one of the great forces of nature, without giving it a certain character, an interest of its own, provided it is carried out in a simple and unaffected manner, and with direct reference to its practical purpose. You cannot build a stone bridge across a river without producing a fine object in the sweep of the arch and the resisting mass of the abutments. A suspension bridge, again, with the catenary curve of the chains designed for us, as it were, by nature herself, is so beautiful an object that it is exceedingly difficult to spoil it; engineers have succeeded in spoiling it in some cases, as I shall have occasion to show, but it is because they will not always be content to let it alone sufficiently. But the girder—the box girder and lattice girder? Certainly they have not the same beauty of line as the arch or the chain; and, moreover, when it comes to the case of a bridge for ordinary traffic, and especially in connection with the architecture of a city, every architect must feel that the introduction of iron construction interferes with the monumental character of the structure, and is more or less a discordant element in relation to the surrounding architecture. The case of a railway bridge is somewhat different. Here, where the span to be bridged is a large one, the steel girder is redeemed in our eyes, or should be, by its obvious practical suitability to its purpose. A stone-arched viaduct over land, with comparatively narrow arches, is satisfactory to our sense of structure, and may be, and often is, a very fine object; but a stone bridge of wide span, and with an arch necessarily very flat at the crown, would not give the same sense of security under the rush of a heavy train, besides costing much more to build—the question of dividends again coming in. It is absurd, therefore, to blame engineers, as if they were enemies of the human race, for erecting a girder railway bridge in a situation where, as people say, it spoils the scenery; if the span is a long one they would hardly be doing their duty either to their clients or to the public by adopting any other form of construction. The most serious drawback to iron structures, considered in their relation to scenery, consists in the necessity for painting them. In stone you have a natural material which harmonises with the landscape; in brick you have a material which takes on tints from weather and, therefore, ultimately harmonises; in the case of iron you are reduced to the paint-pot. In regard to considerations of form, a clever engineer observed to me that people were satisfied with stone or timber construction, in an æsthetic sense, because the treatment of the materials, and the manner of making connections in timber work, were familiar to them, and consequently had a kind of old association attached to them; and that when the public had become equally familiar with the sight of iron construction and its methods, they would have a similar association with it, and would cease to regard it as intruding on and spoiling the landscape. There is something in that, I think; it is an idea worth consideration, at all events. Still, as I said to him at the time, that does not get rid of the crude effect of the paint, which has to be over and over again renewed.

Apart from these considerations, the girdo-phobia, as we may call it, of many artists and persons of æsthetic sensitiveness seems to be exaggerated. A girder bridge is certainly not so pleasing in its lines as an arch or a suspension chain; but, after all, it is only a beam on a large scale; the most perfect style of architecture in the world deals with beams or lintels, and has no arched forms; and the girder is a large and specially constructed lintel or beam, according to the way in which it is used. I will read you just now, when we have the illustration before us, what one of the most eminent and thoughtful art-critics of modern times said of one celebrated example of a box-girder bridge. But in all these cases simplicity of design, absence of anything like pretentiousness, a simple definition of the practical lines of the structure, are the conditions under which it will have the best effect. If a structure of this kind is let well alone, simply treated as a piece of unadorned construction, it will in a sense make its own æsthetic. I saw a good example of this in some of the illustrations to a history of the Intercolonial Railway in Canada, by its engineer ; a line about a thousand miles long, most of which was surveyed and laid out, in the first instance, through uncleared forest. In spite of the abundance of timber along the route, the engineer decided against wooden bridges, in view of the frequent cases, on American and Canadian railways, of their destruction by fire. Across a good many of the minor valleys or hollows the line was carried on lattice-girder bridges supported on simple rectangular pyramids of undressed stones, rather wider at the top than the width of the girder, and without any "treatment" of any kind, the girders being just laid across the tops of these stone piles. These really looked quite picturesque ; it was the Dartmoor rustic bridge on a large scale. They certainly looked far more in keeping with the landscape than if they had been carried on and bolted to iron columns ; and, in fact, one of the principal drawbacks to the appearance of iron railway bridges in many cases is the tenuity of the supports. The real necessity for the iron is in what we may call the beam portion of the work ; if the piers can be made of stone or granite, so as to give mass and breadth to the supports, half the architectural objection to the iron girder bridge is done away with.

We will now go through a few examples of engineering works in which there is little or no attempt at anything more than the simple construction. Most of these will be bridges, partly from the necessity of the case, for it is not easy to get lantern views of any engineering works except bridges. Engineering works are not photographed for lantern purposes as a rule, because the public do not care about illustrations of them ; but there seems to be an exception in favour of bridges, which are regarded as objects possessing a certain degree of picturesque interest. But inasmuch as this Paper arose mainly out of the controversy which has taken place lately in regard to the new Vauxhall Bridge, it follows fortunately that the class of objects of which it is most easy to obtain illustrations are those which have the most direct bearing on the case. I have divided them into groups, commencing with a group consisting of what may be termed the trestle type of structure, in which the construction is formed with struts and ties, and dispenses with massed-up material in the way of built piers or abutments.

We may begin with an example of the most unsophisticated kind, that of the *Skeena* bridge in Canada, the work of native Indians. Absurdly naïve as this erection appears, it nevertheless contains a great type of engineering construction in embryo ; it is a cantilever bridge, and is constructed on the same principle as the Forth Bridge, the cantilever portions, which are apparently anchored by being simply stuck into the ground on each bank, being projected from each side as far as was possible, and then connected by a central span slung between them. Hence it appears that the natural and unconventional instincts of man tend towards the use of the cantilever principle. The next example is a Japanese bridge, which, though it is a much more finished structure in appearance, and is picturesque enough, is nevertheless much less scientific in principle than the Indian attempt, its construction depending entirely on the facility for fixing as many piers as you like in the bed of the stream, or pond, or whatever it is. In this case the curved form of the roadway appears to have been chosen purely from a desire for the picturesque ; there can be no question of headway for boats, for the waterway is in any case barred by the longitudinal ties, and it would have been both easier and cheaper to keep the bridge roadway level. But the Japanese are a nation of artists, and are prepared to make practical sacrifices for the sake of picturesque effect ; yet whether that fact shows them to be a more enlightened or a less enlightened nation than ourselves is a question I will leave to the meeting. The two next examples, the covered bridge at Schwyz and the well-known bridge at Lucerne, should, perhaps, not properly have come into this section, for they are really wooden girder bridges laid across the heads of stone piers, exactly on the same principle as many modern railway bridges, but they are timber structures, and therefore I included them in this section, as we shall not have any timber structures in the other groups. We consider these structures picturesque because they are old and made of timber; we say that a construction on exactly the same principle by the modern engineer is not picturesque, because the girder is made of steel instead of timber. Is that rational, or is it only a prejudice of association? A question I will also leave to the meeting.

The next is the Barton Aqueduct on the Manchester Ship Canal, and here I think we must charge the jury against the engineer. It is a small structure; it might have had character and picturesque effect with no additional expense, and have done its work equally well. It has no character; an architect might have given it some; we have only to look at Mr. Ernest George's two little drawings of wooden bridges, which are hung up in the room, to see that. The next example, a bridge on the Manchester Ship Canal, is open to some extent to the same criticism, though it is better than the last one, and the manner of seating it on the bank is rather effective. We next have the trestle viaduct on the Great Western Railway in Cornwall, which is a striking example of the picturesque effect of a totally unornamented timber structure; nevertheless, it is doomed. It requires constant inspection (I was even told that there was a man on the spot to keep an eye continually on its behaviour under the passage of trains), and it is quite certain that no railway engineer in this country will ever put up such a structure again. The next example is a timber trestle bridge, or it might rather be called an embankment, in Canada. Whether you call that picturesque or not I do not know; it does not appear so to me; it looks untidy and wasteful of material, and suggests the idea of being a temporary scaffolding for erecting something, rather than the erection itself, and it is certainly a very dangerous kind of structure for a railroad, owing to its liability to fire from coals shot from the engine. The next example, also from Canada, is more purpose-like; it appears, as far as I could make out from examining the slide, to be an iron lattice girder carried on wooden trestles, which is not very satisfactory, but is at all events not so wasteful of material and labour as the last example. We now come to a more scientific piece of modern European engineering work, an iron lattice girder bridge near Fribourg. This is a piece of simple and unaffected tie construction, without the slightest pretence at ornament of any kind; its effect is no doubt very much helped by the masonry bases to the piers, which give it a more monumental character than it could otherwise have. These piers are treated quite plainly, and merely bevelled off at the top. I consider such an erection illustrates favourably the argument that perfectly frank display of structure in engineering works, with no pretence at ornament, is not offensive to picturesque effect; at all events I cannot regard a structure like this as an injury to the landscape. The same remarks apply to the Crumlin Viaduct, a structure of the same class. Lastly we come to the great trestle bridge of the modern era. Whether the Forth Bridge is or is not an ugly thing is a point on which there may be a difference of opinion. The first time I saw in an illustrated paper a view of it as it was intended to be, I own I was fairly startled at the aspect of those three colossal humps of construction. Afterwards we got to be so much interested in the problem, and so much impressed by the enormous scale of the work, that the mind became reconciled more or less to its rather portentous appearance. Its great defect, from an æsthetic point of view, is that unless you compare it with a train moving over or a ship passing under it, there is nothing to give scale to it, and you only realise the size when you get quite close up to it. As to its spoiling the landscape, there is not much to spoil just there; the bridge is at all events more interesting than the banks. Probably it will be viewed in different lights according as people know anything about construction or not. Those who do, regard it with interest; those who do not, probably with some bewilderment. As to artistic or decorative treatment, any attempt at that in a work of this kind would have been preposterous, and would have defeated its own ends.

Coming to the arched masonry type of structure, the aqueduct at Segovia illustrates what I was saying before as to the purely utilitarian character of these structures. The small mediæval bridge—an example in Monmouthshire—illustrates much the same thing. The ribs or groins which add so much to the effect of the arch are an element of the picturesque to us; they were not so to the man who built them—it was the accepted manner of building an arch then. The Pontypridd Bridge is a curious example of what was probably regarded as a bold attempt to span the stream with one arch, at the cost of a very heavy gradient. A modern engineer would do it with a horizontal girder, and would be abused for spoiling the scene; but how could he do otherwise, for what Rural Authority would pass such a gradient as that nowadays? The Berwick-on-Tweed Bridge is a good example of the simple form of late mediæval arched bridge—at least, the piers and the corbel-table are mediæval; the arches rather look as if they had been re-turned and refaced at a later period. The Balcombe Viaduct is a fairly good modern counterpart to this. Brunel's brick one-arch bridge over the Thames at Taplow is a fine piece of construction very simply treated, the order of pilasters on the piers giving a kind of emphasis to their vertical lines, which forms a good contrast to those of the arch. Then we have Kingston Bridge, London Bridge, and New Putney Bridge, all very fine structures, and all of which have this quality in common, that they are treated with the greatest breadth and simplicity, relying for their effect entirely on the disposition of the masses of masonry, not even indulging in the use of an order on the piers, which has been a common and in some cases unobjectionable method of decorating the piers of a bridge, though it is really not in place in such a position. But considering how often architects have applied the order in an illogical manner for the purpose of constituting a decoration, we are hardly entitled to criticise the engineers for doing the same.

Taking bridges in which masonry is used in combination with iron construction, we have in the Victoria Bridge over the St. Lawrence a remarkable example of what was suggested before—that a structure built to resist the forces of nature will almost always have character and interest. Here we have simple massive stone piers, which on the up-stream side are carried out in long spurs to meet and break up the ice coming down after the thaws. There is not a particle of ornament, but the piers and the great box girder laid like a beam over them form a most impressive structure, which would only be weakened by any attempt at ornamental treatment. The Menai Tubular Bridge was built amid many criticisms to the effect that it was a thing of no beauty, which would be an injury to the effect of the suspension bridge, &c. Yet this is how Hamerton, one of the most discerning and enthusiastic of art critics, wrote of it some time after:—

> "The whole bridge is admirable as a work of art, though the art is very simple and severe. The long line of tube (which looks like a great beam) is fortunately broken by the piers of marble which are finished above the beam as towers, and the majesty that naturally belongs to a work of colossal size and weight is enhanced by the prudent use of some architectural adornment. The tubular bridge over the River Conway near the castle is less fortunate, because the neighbourhood of a great mediæval building led the architect of the bridge to adopt a castellated style for the entrances to the tubes—a style which might be more or less in harmony with the fortress, but would scarcely in any other situation have been chosen to accompany a bridge which was nothing but two parallel beams."

The tower in connection with the waterworks at the Llanwyddyn reservoir is an example of the same kind of sham mediævalism. It was well intended, but there is nothing appropriate in making a waterworks tower look like a Rhine castle. Somehow engineers seem nearly always to fancy that there is some suitability in castellated and battlemented architecture for waterworks erections.

Among other large erections of the combined masonry and iron class the Tay Bridge is a fairly good example, and the simplicity with which the masonry is treated is commendable. The Saltash Bridge, a most remarkable structure in an engineering sense, fails to some extent in effect, because the piers, though sufficient in reality, are not massive enough in their proportions to balance, to the eye, the heavy lines and proportions of the girders.

Taking examples of suspension bridges, the Menai Suspension Bridge is in every respect one of the most beautiful structures of any kind in England. The simple but massive treatment of the towers, spreading toward the base, is admirably suited to their situation and function. We may realise this the better by comparing it with the Brooklyn Suspension Bridge, where the iron portion is equally good; the slight but visible camber of the roadway line especially adds a great deal to its appearance of stiffness combined with lightness. But the towers are weakly treated in comparison with the Menai towers, and have the same fault as those of the Saltash Bridge—they are not a sufficient balance to the ironwork. But in general we may say that all the things we have been considering hitherto are characterised by simplicity, sometimes showing nothing but the unadorned construction; and where there is something of an architectural treatment, it is of a broad and simple kind and with no gewgaw about it. It is within the last quarter of a century or so that the minds of engineers have been poisoned with the terrible ambition to produce "handsome" structures, and in the endeavour after that have they entered on a field for which their training has in no way fitted them. Now there are occasions when an engineering work may fitly be the subject of ornate treatment as a work of architecture. But it seems impossible to get engineers to understand that the handling of decorative architectural detail is a matter requiring special training, and cannot be done by a mere instinct. And it is in consequence of this unfortunate misconception that recent engineering works are becoming objects of horror and dismay to us. When London and Waterloo Bridges were built, engineers could produce works which were not only useful but grand and impressive. Now they are rapidly ceasing to do this, because they are grasping at something else which is often quite unnecessary, and is at all events out of their range. The two mistakes we most frequently meet with in these ornate modern engineering works are coarseness of design in ornament and mouldings and want of perception of scale. In fact, it appears that engineers hardly realise what scale means, and think that a detail which is good on a small scale is good on a large scale, which by no means follows. *Scale* may be regarded in two lights. It consists partly in so proportioning all the parts and details of a design that they shall have an harmonious relation to one another, that they shall all appear to be parts of the same conception, and not as if they were details culled from buildings of various sizes and illogically fitted together. This is what may be called perception of scale in the abstract. Besides this, there is also what may be called conventional scale: the recognised and habitual proportion to each other of details (such as those of the orders) which have by long use come to have a certain recognised relation to one another, so that a use of one of them on an entirely different scale to what we are accustomed to confuses our sense of proportion in the structure. This sense of scale is conventional and acquired, no doubt; but if these conventional materials of architectural design are made use of at all, they ought to be used with knowledge and not at haphazard. This modern desire on the part of engineers to make ornamental structures, without having ever studied design in the artistic sense of the word, is producing structures of which we have really a right to complain. Compare the present Blackfriars Bridge, with its coarse carving and its great stumpy column totally out of proportion and out of place, with the design of old Blackfriars Bridge, simple and refined in detail, and with an order used on the pier which is at all events in proper proportion to its surroundings, and assists the effect of the whole design. Compare the Chelsea Suspension Bridge, with its decanter-stopper finials, with the simple grandeur of the Menai Bridge. And for the worst example that could be found perhaps in any engineering work, of coarseness and utter ignoring of scale in detail, take the so-called ornamental treatment of the end of Hammersmith Bridge, with its enormous acanthus leaves on the ends of the girders—things badly enough designed even if they were small, but on this scale so preposterous that they can only provoke laughter.

The Tower Bridge is an example of a different kind; it represents the vice of tawdriness and pretentiousness, and of falsification of the actual facts of the structure. It is stated that the exterior clothing was designed by an architect; he cannot have been a very eminent one, as we never hear his name; it looks to me more like what results from the advertisement we sometimes see—"Wanted immediately a draughtsman; must be an expert Gothic hand"—it is draughtsman's architecture. The exceedingly heavy suspension chains are made to appear to hang on an ornamental stone structure which they would in reality drag down, and the side walls of the apparently solid tower rest on part of the iron structure, and you could see under them before the roadway was made up. All architects would have much preferred the plain steel structure to this kind of elaborate sham. The same kind of spirit is showing itself in the treatment of ironwork; capitals inserted where they have nothing to do with the structure, spandrils filled in with bad Gothic tracery, and so on. If iron is designed on good lines, it will look better in itself without these gewgaws. We could not have a better example of this than the Galerie des Machines at Paris; an iron-roofed structure on the grandest scale, in which there is not a particle of decoration, and yet which is so fine and imposing in its effect that it deserves to be called a great work of architecture as well as of engineering.

Turning to the subject of the proposed Vauxhall Bridge, we will look first at the illustrations of the bridge at Coulouvrenière, near Geneva, which is understood to have given the suggestion for the Vauxhall Bridge design. The Coulouvrenière Bridge is built over the double stream of the Rhone, which here flows in two streams at slightly different levels, one of them wider than the other. For the sake of symmetry, a small arch has been inserted on the wider side, forming the centre span of the bridge, the two wider spans being equal on each side of it. The centre narrow span is emphasised by four columns, two on each side of it above the piers, which may have some symbolical meaning. These have furnished the hint for the row of useless columns shown along the whole length of the Vauxhall Bridge design. The general aspect of the Coulouvrenière Bridge, from a distance, is picturesque, but the details will not bear examination, and in fact, from an architect's point of view, it is a very bad design. The columns have no proper foundations, and are bracketed out over the side of the bridge wall in a very clumsy manner. The decorative details show badly designed *rococo* ornament meandering partly over the surface of rusticated quoins, to which they bear no relation. The archivolts of the arches are strongly emphasised by sham quoins of very pronounced character, executed in cement in imitation of stone. In the Vauxhall Bridge design immense quoins, with a rustication of one foot projection from the wall-face, are carried round the archivolts. The defect of the bridge, in regard to appearance, is that it is unusually thin at the crown of the arch; the concrete construction allows of this, but in facing it with granite the visible arch looks exceedingly thin and weak at the crown. By emphasising the archivolt course by rustication, and at the same time entirely separating it from the spandril masonry, which is kept quite flat, this thin and weak appearance of the visible granite arch is increased; and at the same time the large and deep cornice, of very coarse mouldings, still further reduces the visible depth of the arch at the crown. The details show a complete ignoring of scale. The single moulding which crowns the plinth of the main piers is nearly three feet in vertical height, and this magnified moulding operates to reduce the whole scale of the rest of the work, making the quoins on the face of the pier, which are really very large, appear trivial. This is an offence against "abstract scale," while the insertion of a necking moulding on the semicircular projection on the face of the pier at once transforms it to a column, of immense thickness and quite out of proportion to any function of a column in such a position. This is an offence against "conventional scale"; but for the necking the projection might have appeared as a portion of wall on a circular plan; the necking transforms it, conventionally, into a column, with the result stated above. The carrying of the cornice round this column, in the guise of a capital, is another architectural absurdity; and, considering that the whole thing is on a raking line, the working of the mitres of all these mouldings, running round the column on a raking line, could only be managed by a system of fudging. In fact, the whole thing is a jumble of incongruous details, put together by some one who does not understand the language of architectural design.

The problem of treating a concrete bridge with a granite facing is, in fact, rather a new one. The granite is here, in reality, only what the French call a *revêtement*. One architect sent me a suggestion that the bridge, being a concrete construction, ought to be left as such, but I think we should all agree that a mere concrete bridge, however "honest," would be a very bald-looking affair. Mr. Mountford had made a suggestion that the voussoir lines should be carried right up over the face of the spandrils and up to the capping of the balustrade, in a flat form, thus giving increased depth to the face of the arch. I have tried the effect of this, in a design purposely kept very plain (fig. 1), not taking the channelling of the voussoir joints, however, up to the capping, but only up to the plinth line of the balustrade, as I think it would be a pity to lose the open balustrade. The object is, you see, to give it a flat appearance, answering to the idea of a *revêtement*; and by omitting any large cornice and introducing only a string and corbel table, to get a greater apparent depth at the crown of the arch; five feet instead of the two feet six inches of the County Council design. The balustrade capping and the string are both stopped against the pier, to avoid raking mitres. The pier is treated on the face as a buttress, and has no rustication, because if the channelled joints of the voussoirs are carried up to stop against the projection of the pier, it is obvious that you cannot emphasise the jointing on the pier, as the two would quarrel with each other. The plain lamp standards, on a pedestal rising out of the curve of the buttress, are in the manner of the ironwork of old Vauxhall Bridge—flat, heavy castings. I am not offering this as what I would carry out; it is a very plain design made *extempore*, I may say, merely to try the effect of that treatment of the face of the arch. The other design (fig. 2) is by my draughtsman, Mr. Curtis Green, to whom I suggested that he should try what he could do with a simpler design on the same lines of arch and parapet as those of the County Council design. He has retained the arch-quoins, but made, I think, a pleasing design. However simple both these appear in comparison with the pretentious character of the County Council design, I do not believe either of them, if originally proposed, would, at all events, have raised any outcry on the part of architects.

Finally, in regard to the general subject of the designing of bridges, I should like to put one question, which will, perhaps, seem a very heretical one to engineers, but which I think is, as Falstaff said, "a question to be asked." If it is urged that, in the case of bridges which are to be decoratively treated, the engineer should be assisted by an architect, why should it not be put the other way about—that an architect should build the bridge, assisted by an engineer? Architects are not familiar with the problems incident to forming foundations in deep water, in the bed of the sea, or of a river; but as soon as the structure clears the water, if it is to be an architecturally treated bridge, it is really more of an architect's business than

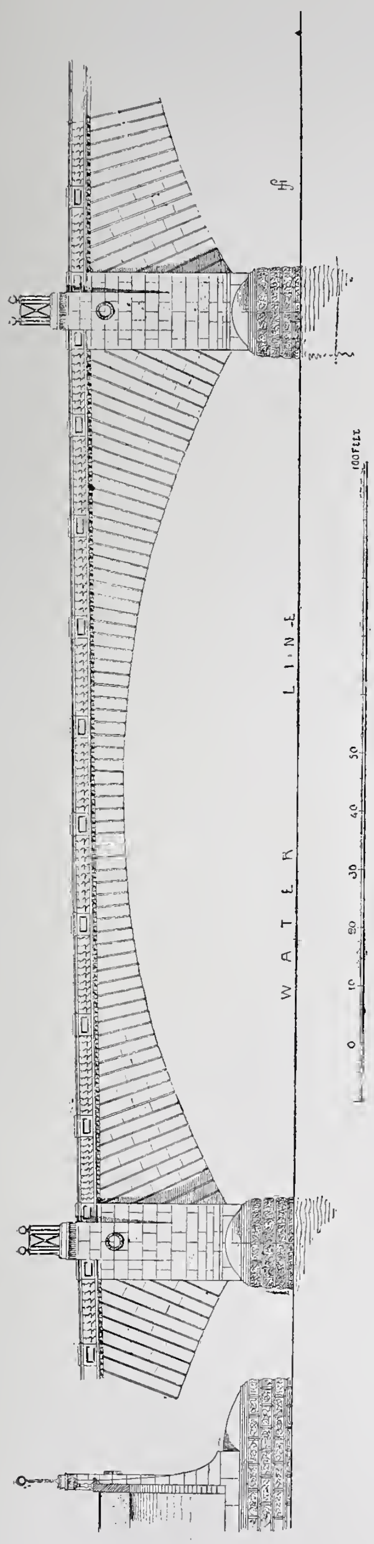


Fig. 1.

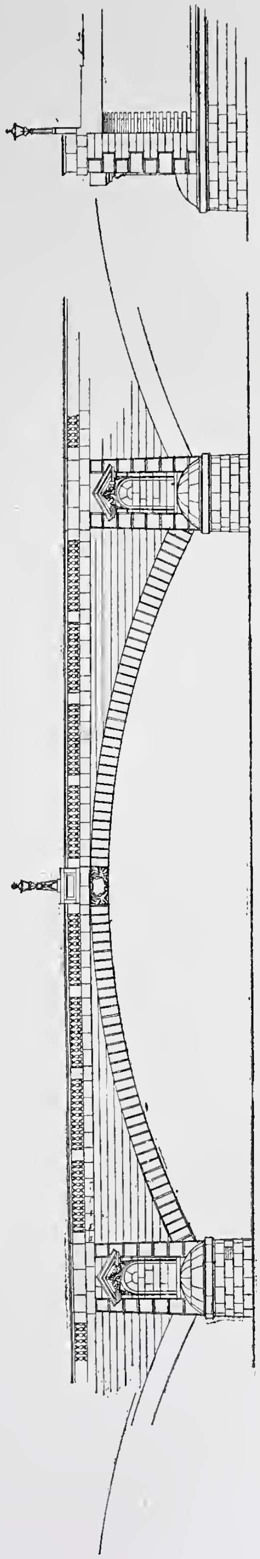


Fig. 2.

an engineer's; and I think it may very well be questioned whether, instead of the authorities saying to an engineer, "Build us a bridge, and we appoint Mr. ——, F.R.I.B.A., to assist you in the decorative details," they should not rather say to an architect: "Design us a bridge, and we appoint Mr. ——, M.Inst.C.E., to prepare the foundations." But I fear that this is throwing an Apple of Discord on the board.

DISCUSSION OF MR. STATHAM'S PAPER.

Professor AITCHISON, R.A., *President*, in the Chair.

THE EARL OF WEMYSS AND MARCH [*H.A.*] regretted that his deafness had prevented him hearing a good part of the Paper. He was, however, in thorough sympathy with the principle, that the design of some of the engineering bridges should have been under some sort of control before being carried out. The Forth Bridge was a wonderful construction, but it had absolutely destroyed the landscape. One of the most beautiful places in the world, belonging to Lord Hopetoun, had a lovely view down the Forth, but the bridge now blocked the prospect. Engineering skill, he thought, should have been able to give all that was required without disfiguring the landscape. The first bridge at Cannon Street might be a good or a bad one, but immediately after it came a girder bridge, which shut out the whole view down the river. Take again the elephantine Hungerford Bridge: nothing could be more ugly. These great bridges, and all public works, had to go through Committees of the House of Commons, whose business it was to decide whether they fulfilled a public want, and the money had to be found. When that had been done the engineer should be under some sort of control—whether the control of the Institute of British Architects, or of some Parliamentary Committee. Before the designs were passed, the matter should be looked into to see that other things were not destroyed by the structures. One matter he felt very strongly upon: there ought to be models exhibited. Models were a necessity, and he thought it was a matter the Institute should take action upon. There was a great chance to do so now in connection with the public buildings about to be erected in Parliament Street and Whitehall. He was not aware that the Institute had made any move in that, any more than they had with regard to St. Paul's. He was perfectly astonished that the Institute did not petition, and move, and do everything they could to save St. Paul's. It had been left to private bodies and private individuals to act in the matter. He hoped St. Paul's had been saved to a great extent, and that all the stencilling and black lettering would now be taken off. Architects' drawings, in his experience, were the most deceptive things in the world. The only safe course was to see everything in model. He had had to build himself, and when he had got a satisfactory design his plan was to have it first modelled in plaster, and then a part of the building was modelled in the actual material one-third the size. This was the practice in France very much more than in this country. The new buildings in Parliament Street were to be put up without any model, and some day they would regret it. He remembered one of the designs tendered for the Admiralty. It included a tower nearly 400 feet high to be put up at the corner of the Horse Guards. The authorities had a model made about 10 feet square of all that part of London. The tower was put up, and it fell, as it ought to have fallen. He had been struggling to get Cromwell put up in model, but in vain He was to be put in a pit, like a bear in the Zoological Gardens, on a very tall pillar. An example of the advantage of setting up a model was afforded recently at the Tate Gallery. A statue was to be erected to Millais, and it was a question whether it should be on the steps or in the garden. A rough model was put upon the steps, but it would not do there. It was put up in the garden, but was found to be much too big—it ruined the building. If it had not been for the model the whole building would have been spoilt. Therefore the Institute should urge that all public works paid for with public money should be put up in model first. As for statues, he did not care whether they were out of public or private money, if they were put up in London they should all go through the same ordeal.

THE PRESIDENT said that before the designs were sent in, he had impressed upon Mr. Akers-Douglas the importance of having models made, and he understood they were going to be made.

MR. A. T. WALMISLEY, M.Inst.C.E. [*H.A.*], said he was sure they were all in perfect sympathy with the arguments Mr. Statham had so ably given, and so interestingly illustrated. There was no occasion for architects to do their own engineering any more than that they should be called upon to do their own quantity surveying. An engineer should seek the co-operation of an architect for his artistic details. An architect had not the inclination frequently in his early studies for that mathematical pursuit which was so essential for an engineer in order to be able to calculate his structures, and not only to put plenty of material in his design but to introduce it in the right place. It needed engineering experience to arrive at the correct data for units and assumptions in structural calculations. He therefore thought that while engineers should be responsible for the stability of structures, architects should always be called in to do the artistic arrangement of parts. He was pleased with what Mr. Statham said in allusion to many of the structures he had brought before them. With reference to Mr. Statham's allusion to the importance of paint for engineering structures, it had struck him that there was one defect in the Forth Bridge, much as engineers justly admired it, and that was in the adoption of tubular struts, which could not be painted on the inside. If they had been made of open lattice work, as had been adopted in other bridges, they would have been accessible to the painter's brush. There was one bridge over the Thames not alluded to by Mr. Statham which had always commended itself to his mind, and he had no doubt it would to members of the Institute, as a good engineering design, and that was the Victoria Railway Bridge over the Thames near the Chelsea Suspension Bridge. With regard to the Chelsea Suspension Bridge, the towers as they appeared to the public were not true towers—they were patchwork; there was no truth in them. It was an attempt at ornament to cover the true towers, in the same way as was done in the Tower Bridge. But in the case of the Victoria Railway Bridge, if the parapet were examined it would be found an essentially engineering design. It could not possibly be made in masonry, and therefore it was a true iron handrail, which commended itself to his judgment as an engineer. Neither architects nor engineers had any right to make any iron structure as necessarily an imitation of either a timber or masonry design. Let them be true, as Mr. Statham had so well pointed out, and then they would attain their object.

Mr. HENRY LOVEGROVE [*A.*] thought Mr. Statham was in error on one point. It was well known that Sir Horace Jones designed the architectural portion of the Tower Bridge; but it was not so well known that Mr. G. Stevenson, who had been for some years his draughtsman, finished the details by order of the Corporation.

Mr. STATHAM said that Sir Horace Jones certainly made the first design, but the design as built was different and very inferior.

Mr. BERESFORD PITE [*F.*] thought they should express their obligation to Mr. Statham for the very interesting lecture he had given them. Mr. Statham, he was sure, had succeeded in carrying conviction to their minds, as in such a subject as this there was nothing so certain as the ocular demonstration that they had been favoured with, in addition to a skilful, discriminating analysis. As soon as they accepted Mr. Statham's fundamental principle that the simple expression of the structural purpose of a building gave it dignity of purpose, and not of necessity without dignity of appearance, they had arrived at a basis of design in most of the problems that presented themselves in the structure of bridges and viaducts. If the engineers would be content with the real greatness of the work they had in hand, further efforts at ornament might be needless. The tendency to ornament was natural to the human being. The savage would decorate himself, and the engineer, proud of his skill, must decorate his building. Architects, however, had to bring to bear on engineers their own personal ideas of the suitability or beauty of ornament, and here came the difficulty. If Sir Alexander Binnie would take up the line with regard to the decorations of Vauxhall Bridge that Sir William Richmond took up with regard to the decoration of St. Paul's, the public would be at an *impasse*, and nobody would be able to tell the one that his ornaments were any worse than those of the other. As a member of the Council, it might not be out of place for him (Mr. Pite) to state that the Institute as a body was not content to leave those things alone. They had been agitating with reference to Vauxhall Bridge, and had been approaching the County Council, and, in spite of some coldness on their part, he hoped that before very long the public would be able to learn that their interference had been beneficial in the interests of ornamental art. He hoped they might be able to apply the governing principle of Greek art to Vauxhall Bridge, and beautify it by a system of elimination into a more beautiful and severe style. They had no quarrel with the designer on the score of construction, although they might have different opinions as to the advisability of casing a plastic material with granite; but, accepting the facts as they were, it was certain that the application of artistic experience to the details would be beneficial. The public protest with regard to Vauxhall Bridge was signed by the President of the Institute, and circulated by the Institute, and that undoubtedly was the most important protest that had been made. He referred to the protest which appeared in *The Times*, and was signed by, amongst others, the Archbishop of Canterbury. Since that date the Institute had not let the matter lie. They had approached the members of the County Council in deputation, and negotiations were going on now, and they had very well-founded hopes that their interference had not been in vain. As the noble lord had referred to St. Paul's, he might say that the Institute had not been backward with regard to that. As an Institute they could not publish every step they had taken in the matter, as it would defeat the ends they had in view, but members would be glad to know that with regard to this question they had not been altogether asleep. In concluding he begged leave to move a very hearty vote of thanks to Mr. Statham for his lecture.

Professor KERR [*F.*] thought that the system of exhibiting illustrations on the screen was delusive to a certain extent. It must be borne in mind that the photographs reproduced on the screen were taken from points of view which suited the artist, and not perhaps the architect. He had listened, however, with very great attention and with very great interest to Mr. Statham's discourse. It was not so academic as he expected it might be, which was all the better. It was very suggestive, and it seemed to him its suggestiveness throughout came ultimately to this, that from their point of view architectural design was a beautification of building; and, if so, why should not a building be beautiful to the engineer? The first principle was that the construction should be correct. The second principle, that that construction should be carried out with an eye to grace. There was no reason why the works of the engineer—more particularly in bridges and the like—should not be rendered as graceful as any of the works of the architect. How was this to be accomplished? A good deal was done in foreign countries. There were examples in various parts of the Continent—in Austria, in Germany, in France—which might have been shown if the lecturer's attention had turned that way; but in Great Britain there was absolutely no example which they could say was up to the mark as an effort to beautify the structure of the engineer. There was no reason for this. They did not insist on the engineer doing it all himself, any more than they asked the decorator to do his part of the architectural effect. For the credit of the nation, if a beginning could now be made by some manifestation of opinion on the part of the Institute and its friends, an opening at all events might be made towards a most desirable result. The mere exhibition of a fine bridge in conjunction with its surroundings was not what he understood the architectural treatment of a bridge to be. The conventional, or, at all events, the high artificial treatment of its construction upon constructive principles and upon conventional principles which had grown up, not in one nation alone but in the general community of nations, from the commencement of time, furnished a volume of knowledge which surely could be applied to engineering works quite as effectually, and quite as effectively, as to the works of the artist. He seconded the vote of thanks to Mr. Statham with great pleasure. He was glad to find that the discussion had so far taken what he considered to be a right course. With regard to his old friend Lord Wemyss's argument as to the preparation of models, it was well known that on the Continent it was a rule to present a model of a public monument of a reasonable size before the public were committed to it. It was a great mistake that nothing of the sort was done in this country. They would not, of course, put up a full-size model of a new building, but there would be no harm, if the Government did not understand drawings—and he understood from Lord Wemyss that they did not—in making a model of the buildings. He was quite sure the Meeting would agree with that.

Mr. WILLIAM WOODWARD [*A.*] thought that most members of the Institute would agree with the general propositions laid down by Mr. Statham with regard to the almost universal ugliness with which engineers covered their structural works. There were two instances where not only the structures themselves were exceedingly ugly, but they tended considerably to spoil excellent views of what were perhaps the most magnificent buildings in the world. He referred to the bridge across Ludgate Hill, which so dreadfully interfered with the view of St. Paul's Cathedral; and to the ugly structure of lattice girders which crossed the Tiber, and which interfered with the view of St. Angelo and St. Peter's at Rome. They must all agree with Mr. Statham's condemnation of Blackfriars Bridge, and he wished more had been said as to the unmitigated ugliness of the Forth Bridge, which no constructive skill on the part of the engineer could minimise. Referring to Vauxhall Bridge and the communications the Institute had had with the London County Council, Mr. Woodward alluded to a joint letter from Mr. Waterhouse and Mr. Mountford after their interview with Sir Alexander Binnie, wherein they expressed their entire satisfaction with the design subject to a few corrections. Considering that expression of approval, he could not understand the action of the Institute in publicly condemning the design of this bridge. Coming to the detailed criticism which Mr. Statham had passed upon the bridge, some part of his paper was devoted to the columns carrying nothing. It was unfortunate that attention had not been directed to what was almost a modern feature of the "high art" architect of to-day in erecting columns which carried nothing. He himself had called attention to the hotel erected in High Street, Kensington, by a very distinguished architect, where they would find columns carrying nothing. He could give a dozen instances of the same kind of thing. With regard to the casing of concrete with granite, they were all aware that one feature in the decoration of the finest Italian churches was the casing of a material with marble. He had never heard any severe condemnation uttered in that room against that principle. Why, if the concrete structure had the merits which Mr. Statham himself admitted it had, it should not be cased with an excellent, durable, external polished surface in the form of granite he did not understand. To his mind there was no objection whatever to it. There might be differences of opinion, but he was certain that when that bridge was erected, if it were erected in the form shown them that evening, it would not only be a credit to London, but be a credit to Sir Alexander Binnie, the engineer who was constructing it. He thought that the London County Council was not to be blamed for its action in this matter, because it had had several conferences with representatives of the Institute, and if those conferences had not resulted as some of those representatives appeared to desire, he was sure it was not the fault of the London County Council.

Mr. E. W. HUDSON [*A.*], in supporting the vote of thanks, said that, apart from the questions of proportion and ornament in engineering design, one had to consider its fitness to the surroundings of landscape or architecture. In a position of wild and rugged scenery he thought an ordinary notion of appropriateness should prevent a civil engineer going so far wrong as to design a delicate structure or overlay it with useless ornament. But it was otherwise when such works were required in great cities or near historical buildings in town or country. In such cases he thought the architect and engineer should collaborate, and a model be afterwards made to scale, as Lord Wemyss advocated, for consideration. He doubted, however, if either profession cared to admit, so far as designing was concerned, that it needed any help outside its own branch. As an illustration of fitness and want of fitness to architectural adjuncts he instanced Westminster and Hampton Court Bridges. They had been interested in numerous examples shown by Mr. Statham, but he wished to know that gentleman's views as to Mr. Page's bridge at Westminster, where he believed Sir Charles Barry had been also consulted. Mr. Statham objected to castellated forms for bridge piers, but he thought it was the right thing to do to have this structure in the style of the Palace adjoining. It seemed to him, *e.g.*, less incongruous than the adoption in Paris of a classic form of bridge, as the Pont de Jena, Pont Notre-Dame, and others in contiguity to the Gothic buildings on the Ile de la Cité or the Renaissance buildings on the quays. It was an attempt at glorifying a kind of pseudo-Roman empire under the Napoleons. In many things, however, we might take a lesson from the French in regard to public works and design. He thought Mr. Statham rather hard upon Chelsea Suspension Bridge. The curve of its chains was naturally beautiful, and the general effect (perhaps aided by a slight fog, as suggested in regard to the Tower Bridge) was light and elegant, although the detail might not be particularly architectonic. The old Hungerford Bridge was perhaps an honester instance of design. As for the iron bridge at Hampton Court, he thought all architects must feel that it was a blot upon the landscape, and wish that its attempt at Tudor girders could be replaced even by an engineer's bridge, however plain and incongruous it might be. It was a lost opportunity for embellishing a river of which they were all proud. He thought it possible to design a Gothic as well as a classic bridge without its being justly considered a forgery. As regards Vauxhall Bridge design he only hoped in the multitude of counsellors there would be wisdom; but it was a more difficult thing to alter a design than to set to work and make another. This the assured dignity of the London County Council would not permit, to say nothing of the *amour-propre* of the engineer. He did not like the proposal shown by Mr. Statham's sketch for carrying the voussoir joints up to the parapet, and the manner adopted in Waterloo Bridge arches was, he thought, preferable. He was not aware that the bevelled lines of the arch spandrils of the Pont de Neuilly in France had been elsewhere recently adopted. The arris was cut away largely at the haunches, and lightened the spandrils and the whole effect. The idea was partly adopted in the cast-iron facing of New Battersea Bridge, but in that case by a core or concave verge instead of a convex.

Mr. E. W. MOUNTFORD [*F.*] said he had greatly enjoyed Mr. Statham's Paper, and felt much indebted to him for showing the view of the bridge from which the present design for the proposed Vauxhall Bridge was supposed to be taken. It would be obvious to any one looking at those views that Sir Alexander Binnie had been successful in reproducing the objectionable features of that bridge without its compensating good qualities. Looking at the original, one could see at once the value of the immense piers coming between arches of such great span. The two piers of apparently thirty feet in width gave the necessary feeling of strength to the bridge which the present design wholly lacked. That, of course, was not Sir Alexander Binnie's fault. The Thames Conservancy limited him as to the size of the piers, and thus greatly marred the appearance of the bridge. When a Committee of the Institute some five years ago made a design for the bridge, they did not alter Sir Alexander Binnie's design in any essential feature, but they did take the liberty of increasing the size of those piers by four or five feet; and they were told at once that that was absolutely impossible, because the Thames Conservancy had fixed the size of the piers shown on Sir Alexander Binnie's drawings, and nothing larger was possible. That, one had to put up with, but, after all, he had grounds for saying that it was quite probable that the efforts of the Institute towards an improvement in the design might not be altogether lost. Referring to Mr. Woodward's remarks, Mr. Mountford pointed out that the reader of the Paper had not objected to the casing in granite at all. On the contrary, he said he approved of the casing in granite. The granite casing was necessary to preserve the concrete from the weather and the Thames water. If they could persuade the County Council, as he hoped they would, to remove some of the superfluous ornament, he quite agreed with Mr. Woodward that the bridge would not be a bad bridge. As regards the letter to Sir Alexander Binnie to which reference had been made, that letter was a private letter, and was written with a special object which he was not at liberty to explain now. They simply expressed their approval of the general outline of the bridge, which in their opinion was a very great improvement on the original design. But they did find fault, both in that letter and still more in the interview they had with Sir Alexander Binnie, with what might be called the architectural details—the moulding, carving, and things of that sort. There was very little fault to be found with the general outline, and if they got those architectural details right London might get a bridge of which it need not be ashamed.

Mr. W. D. CARÖE [*F.*], M.A., F.S.A., said he should like to express his great appreciation of Mr. Statham's Paper. One of his chief points, a point which it was a great pity could not be brought out more generally with the public, was the question of ornament: to get people, and especially engineers, to understand what ornament is. The simple question was, how far ornament should be used in certain forms of structure. With regard to Vauxhall Bridge, with its columns extending into the air carrying dolphins, the suggestion made at the Soirée of the Architectural Association seemed to him a very good one, namely, that they were intended for drain ventilators. That brought him to consider a little point which came rather near home at the present moment. The London County Council had recently been spoiling the embankment at Chelsea, which was a very fine work in itself and cost an immense amount of money, by putting up columns of about the same height as those columns proposed on Vauxhall Bridge. In this case they were drain ventilators; but obviously if such a thing were a necessity it ought to be treated in the most simple manner. To call attention to it with any ornament was a grave mistake. That was one of the special cases he would point out where it seemed impossible to instruct the engineer as to what was legitimate ornament. He had himself written a complaint to the County Council, and had received a reply that they were "ornamental" columns, and had been adopted by the Bridges Committee after grave and serious consideration. He could only hope that Mr. Statham's Paper would get into the public press, so that the public might learn something useful from it, and how to differentiate between true and false kinds of ornament.

Mr. STATHAM, in responding, said that with regard to Mr. Walmisley's remarks as to the difficulty of painting the Forth Bridge inside, that was contrary to his recollection, because he was at the works frequently, and had a distinct recollection of seeing the internal hand ladders for going up the tubes. There were, he believed, small doors provided to get into them. With regard to Professor Kerr's remark that the photographs were delusive, in some respects they were; yet they showed the general character. At all events, one could cook a drawing, but not a photograph. It was difficult to illustrate the subject to a large meeting in any other way. Professor Kerr also asked why should not any work of an engineer be made beautiful? He thought he had given his reasons why in some cases it was almost impossible and a waste of time to try to ornament such work. A railway girder, erected for a purely practical purpose, in which one must consider the shareholders' dividends, was a thing one could not afford to ornament. To attempt to treat it as an ornamental work seemed to him out of place. The structure itself was really not so ugly as people said it was. Such structures had only been in use three-quarters of a century, and people had not had time to get used to them. One speaker had referred to Westminster Bridge, and was kind enough to say he would like to have his opinion upon it. He thought it was a very creditable attempt to make a bridge look well, but it lost its interest as soon as one knew that those apparent arches were not the real construction. They were only a piece of scenery. The elliptical arches which rose from the piers and turned over with very graceful lines were not the real construction; that went behind them. As soon as he knew that, he confessed he felt his respect for the graceful lines very much diminished.

The PRESIDENT said they were all greatly obliged to Mr. Statham for the very interesting Paper he had given them. He would venture to say a word or two, because Mr. Eidlitz, the well-known American architect and writer, sent a letter which was read at the Institute about a year ago, in which he pointed out that beauty in nature depended always upon the perfection of structure. No doubt, if we were as able as Nature is, the mere fact of solving the particular problem in hand would, as a rule, make it beautiful; but we, unfortunately, had not that excellence or that skill, so that very often we were obliged to try and hide our want of skill with extraneous ornament. That was the way in which engineering works, especially when they were on a large scale, would be made to command the æsthetic admiration of mankind.

Mr. C. H. BRODIE, writing on the 16th inst., says:

The discussion last night continued to such a late hour that I was unwilling to prolong it. Otherwise I should have remarked on the subject of the new Vauxhall Bridge that, given that the design of the structure is to stand, the misplaced, so-called architectural "trimmings" should be shaved off, and the pier projections left for some good groups of sculpture. The colossal lamp-posts above them are ridiculous, and in any case this is not the place for the lights. The lamps should be over the centre of the arches, so as to give an appearance of keeping down the crown of the arch, whilst the light directs the navigator. The huge columns on the face of the piers would be much better away, and the space left for sculpture. If one speaks of a column—a column complete with base and capital, I mean—one instinctively imagines a thing of beautiful proportions. And not only in itself, but with regard to the structure of which it, or they, form a part. Judged thus, how can those on the proposed bridge be allowed to stay? Mr. Statham praised the "happy accident" that gave us Putney Bridge. But even there the engineer tried to spoil the effect. That he did not succeed absolutely is due to the necessarily fine effect of a series of large arches. Where he could go wrong he did, by making the parapet top and bottom an absolutely straight line, meeting in a point over the centre, instead of a line following the curve of a line drawn through the apex of the arches. I saw in the last issue of the magazine *Travel* (a copy of which I am sending Mr. Statham) a photo of a Japanese bridge, such as was shown on the screen, with high segmental arches without the haunches filled in. But in this one the timber struts exist only under the side arches, and not under the centre ones. And the bridge appears to be wide enough for wheel traffic—though possibly only jinrickshas.

MINUTES. XIII.

At the Thirteenth General Meeting (Ordinary) of the Session, held Monday, 15th May 1899, the President, Professor Aitchison, R.A., in the Chair, with 23 Fellows (including 14 Members of the Council), 18 Associates (including 1 Member of the Council), 3 Hon. Associates, and several visitors, the Minutes of the Meeting held 1st May 1899 [p. 378] were taken as read and signed as correct.

The following candidates for membership, found to be eligible and qualified according to the Charter and By-laws, and admitted by the Council to candidature, were recommended for election, viz.:—As FELLOWS, Edwin Arthur Johnson (Abergavenny); George Augustus Bligh Livesay [*A.*, *qualified* 1895] (Boscombe); Edwin Arden Minty [*A.*]; Andrew Murray [*A.*]; as ASSOCIATE, Jasper Wager [*qualified* 1898]; as HON. CORR. MEMBER, Comte Paul de Suzor (St. Petersburg).

A Paper, by Mr. H. Heathcote Statham [*F.*], entitled The Architectural Element in Engineering Works, having been read and illustrated by means of lantern slides, a discussion ensued, at the conclusion of which a vote of thanks was passed to the author by acclamation.

The proceedings then closed and the Meeting separated at 10.15 p.m.

INCORP. 1837 1887

9, Conduit Street, London, W., *20th May* 1899.

CHRONICLE.

Elections by Recommendation of an Allied Society.

The following gentlemen, unanimously recommended for membership by the Council of the Royal Institute of Architects of Ireland, and found to be eligible and qualified according to the Charter and By-laws, were duly elected Fellows of the Royal Institute of British Architects at the Council meeting of Monday, the 15th inst.:—

George C. Ashlin, R.H.A., 7 Dawson Street, Dublin.
Frederick Batchelor, 183 Great Brunswick Street, Dublin.
Walter G. Doolin, M.A., 12 Dawson Street, Dublin.
William M. Mitchell, R.H.A., 5 Leinster Street, Dublin.
Charles A. Owen, B.A., 16 Molesworth Street, Dublin.
W. Kaye Parry, B.E., 63 Dawson Street, Dublin.

The London Government Bill.

In a letter dated 4th May, the First Lord of the Treasury, replying to the Council's request that he should receive a deputation with reference to Clauses 5 and 6 of the London Government Bill, stated that he thought no useful purpose would be served if he received the deputation at the present juncture; but that if later he found occasion required him to see a small deputation, he would be glad to do so.

Owing, however, to the modifications made in Clause 5 in Committee, and the complete withdrawal by Mr. Balfour of Clause 6, there is no present necessity for further action in the matter.

Architecture in the Colonies.

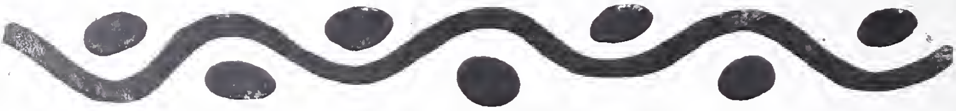
The Paper on South African Architecture, the first part of which was published in the last number of the Journal, is the first of a series of papers which have been promised on Colonial Architecture. The next will probably be on New South Wales Architecture from 1788–1899, by Mr. James Barnet [*F.*], of Sydney, N.S.W.

REVIEWS.

IMAGINATIVE DESIGN.

Arbor Vitæ: A book on the Nature and Development of Imaginative Design, for the use of Teachers, Handicraftsmen and others. By Godfrey Blount. 4o. *Lond.* 1899. [*J. M. Dent & Co., Aldine House, Bedford Street, London, W.C.*]

When tradition in art is sound and vigorous it does not follow that because genius is rare good work must be rare also. The power of creative originality is given to very few. On the other hand there are many who are gifted with a keen perception of what is beautiful, and can do good and interesting work while following the sure lines of a living tradition, but who nevertheless would be lost if its guidance were withdrawn. These may carry on their art unaltered in scope, but growing in perfection within its own limits, until a new inventive genius arises who creates fresh fields for his disciples to work in, and causes the tradition to expand, perhaps to gain fresh glory, possibly to end in ruin.

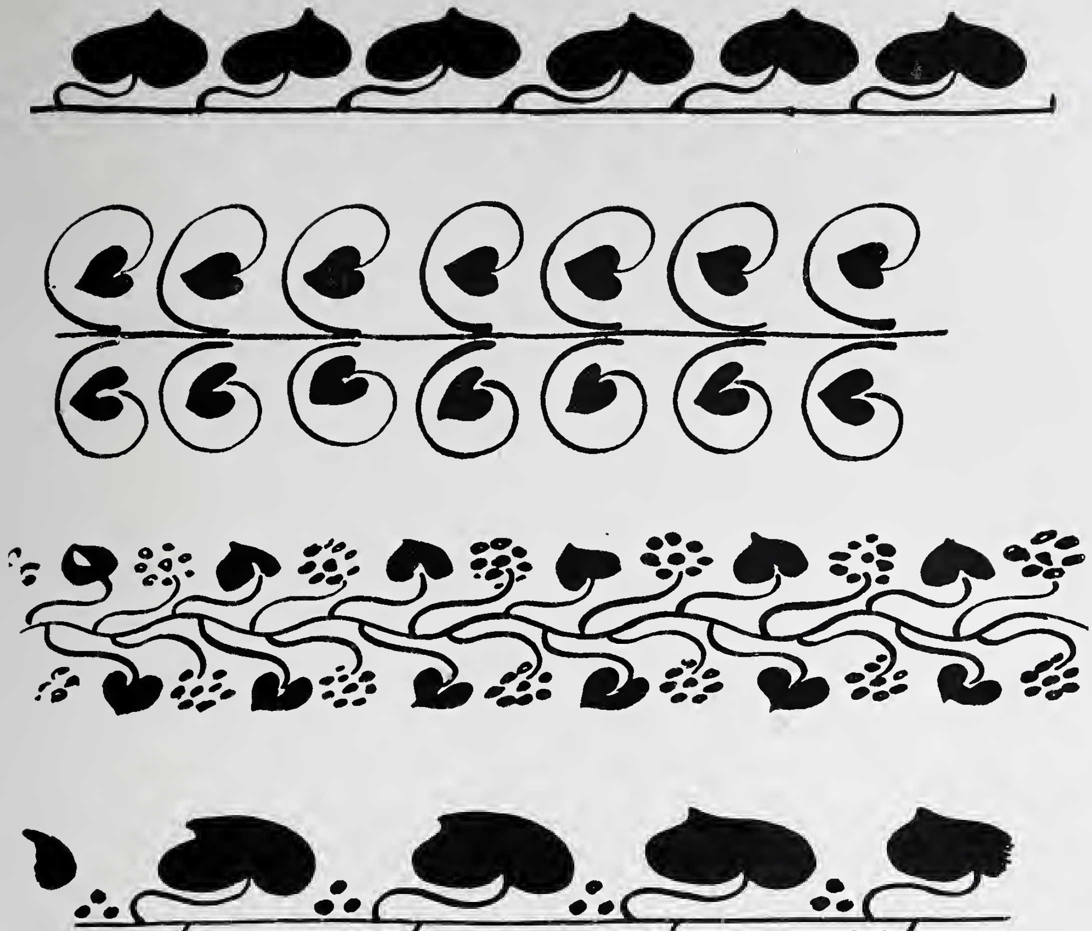


PRIMITIVE CONNECTION OF SPIRAL AND DOT.

In the chaos into which design has fallen owing to the copying of styles whose principles are not understood, and through going directly to nature without the power of translating her meanings into art, the designer has no sound principles to guide him, and no reliable standard for his work. Consequently his designs are more often than not without beauty, without meaning and without simplicity; and the same design is applied without regard to fitness to modelled plaster and sculptured marble, to carved oak and cast iron. Not the least to suffer from our relaxed grasp of traditional principles in design are those arts which minister to our daily needs, and which ought to supply us with things beautiful, however simple, which are a joy to look upon and a pleasure to touch. Any attempt, therefore, to place the principles of design upon a firm basis, and to rescue these everyday arts from ignorance, confusion and indifference, is welcome. In the words of the author, "The aim of this book is to supply a traditional basis for the use of those who are engaged in practising or teaching ornamental handicrafts."

DEVELOPMENT OF SPROUTING SPIRAL.

Art, he says, is the combination of traditional symbols as speech is the combination of traditional sounds. Art that is based solely on the imitation of nature is unprincipled art, because principles do not exist in nature but only in the human imagination. All art is the expression of the life of its time. Its language is the universal one of tradition, the common tongue in which Greek, Italian, Teuton or Celt tells his own tale, gives us his own view of things, and the particular feelings that made him Greek or Barbarian. But we must not try to pose as any of these. "No spontaneity is possible while shallow accuracy and blind subserviency to dead ideals is made a *sine qua non* in art. To produce a masterpiece you must shut your eyes to all previous achievements and draw on your own capital of inborn energy." It is only the artist's realisation of what his imagination bodies forth that makes art good, and though that is the greatest art which has the greatest knowledge of things, it is not the knowledge of their forms which makes it great, but the insight into the part in life which these forms play. The essential is to seize the spirit. The swiftness of the hare is more important than the texture of its coat, and the suggestion of the kingly strength and courage of the lion than the likeness of an individual specimen: "the type and not the instance is the artist's love." A spontaneous method is necessary before an imitative one; the abstract and inorganic spiral with spots in the intervals preceded the spiral that threw off leaves and shoots, and when these were added those forms were selected and typified which coincided most nearly with the preconceived idea. The spiral is universal in traditional design. It is the symbol of life and energy. The wind, the waves, and the clouds take its form. The ebb and flow of the tide, the metre of a poem, our very footsteps obey its laws. It must be inaccurate, as nature is inaccurate, or it will give no true picture of life. Following the laws of growth, the abstract spiral gradually becomes more identified with organic objects. It puts forth tendrils, leaves, and fruit, and is then a symbol of the mind of man controlling nature. It widens to a band, and animals course along its path of motion.



GREEK AND VASE SPIRALS.

Apparently omitted, its controlling force is still felt in the frieze and metopes of the Parthenon. The frieze at its root is a row of spots. These may crystallise into bands of various forms of the rosette or into the triglyph and metope. If the frieze is to express motion, the spots must be of unsymmetrical form, irregularly placed, and all pointing in the same direction—a line of irregular and lopsided ovals. These may be converted into anything we choose: "the flight of birds, the solemn march of geese, the light gallop of deer, or stampede of horses; the triumph, the march, the battle." But their abstract and decorative origin must never be forgotten. We should study the synthetic process of the Greeks, which was the opposite of the present popular one. "The modern method is to construct the whole from the parts. They began with a generalisation, and only admitted details that agreed with their conception of what the whole should be like."

In the same spirit the author proceeds to examine the roots of design in other fields, as the semé, the diaper, and the arabesque, the frame and the border. Only the motive of design claims his attention. The influence of tool and material upon design is mentioned, but is not fully dealt with, it being wrongly regarded by the author as outside the scope of his work. It is of the utmost importance that this influence should be recognised in the present, and it is impossible to over-estimate its effect in the past in controlling, suggesting, and developing the work of the imagination. Proportion in design, so necessary and so often absent, is also excluded. This is a work which, metaphysical by nature and imaginative in treatment, must necessarily contain much matter for argument. That does not render it less valuable or less interesting, for thought stimulates thought. I wish it success in its attempt to help forward that renascence of principle in design which, we hope, is already springing, phœnix-like, from the ashes of the past. J. Humphreys Jones.

NOTES, QUERIES, AND REPLIES.

Early Vaulting at Exeter.

From Professor Baldwin Brown [*H.A.*]—

I am very glad that the Journal has published the drawings by Mr. Harbottle Reed of the curious early vault at Exeter,* which he was good enough to take me to see last year. Is any other example of such a partial use of the diagonal rib known, either at home or abroad? Perhaps, later on, Mr. Reed may be able to give the results of some further examination into the construction of the vault, which is very roughly built. It is worth noting that the diagonal rib seems to have a semi-elliptical curve agreeing with what would be the normal line of a groin, and not the segmental form which Mr. Bilson found in most of the early ribbed vaults examined by him for his recent Paper. With respect to the date of the work, which is ascribed to the last decades of the eleventh century, the scalloped caps of the round central piers need not imply a later period. Though in Normandy they would betoken the twelfth century, they were employed earlier in this country, where we find the cubical cap, plain and subdivided, used in work that is certainly of the eleventh century and may be of pre-Conquest date. The caps of the round piers in the choir at Durham are of the scalloped type, though with fewer subdivisions than at Exeter.

Cav. Boni and his Restitutions.

From John Hebb [*F.*]—

Strenuous in defending that authenticity in buildings which he once defined as being a necessary condition of their value, the architect Boni from the commencement of his career has carried on a fierce struggle against restorers, advocating instead the restitution to their original position, in the very atmosphere for which they were painted or sculptured, of the many masterpieces now buried alive in the galleries of museums. He hopes to live to see the marbles of Phidias come forth from the galleries of the British Museum and be refixed under the lovely sun of Greece on the cornice (*sic*) of the Parthenon. He hopes that Venice will some day require that Titian's masterpiece be restored to the principal altar of the church of the Frari.

A magnificent thirteenth-century bronze bull fell from the front of the cathedral at Orvieto and was smashed to pieces. A new model for the purpose of recasting it was actually prepared, when, on visiting Orvieto in 1888, the architect Boni saw that it was possible to put the ancient fragments together on a framework. The next year he himself carried out the work, which was completely successful, and the antique bull was restored to its place fifty-five years after its fall.

A worse fate threatened the bronze lion in the Piazetta of St. Mark at Venice, which a misguided multitude wanted to replace; strengthened by an internal breast-plate of bronze, the ancient lion returned more proud than ever to its post of sentinel on the top of the column.

Many years ago the usual restorers, under the pretext of great affection for the building, and the risk of injury from the effects of the atmosphere and light, removed some heads of delicate workmanship from the mosaics of Torcello Cathedral, and sold them clandestinely. The heads were partly recovered, but instead of restoring them to their places they were transferred to the provincial museum of the island. The architect Boni, who is the apostle of legitimate restitution, succeeded in restoring the original mosaics to their places two or three years ago, and as a compensation the museum had copies.—From "La Riabilitazione del Foro Romano," by L' Italico, in *Rivista politica e litteraria*, Rome, Feb. 1899.

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* See plate facing page 345 *ante*.

THE PLANNING AND CONSTRUCTION OF BOARD SCHOOLS.

By T. J. Bailey [*F.*],

ARCHITECT TO THE SCHOOL BOARD FOR LONDON.

Read before the Royal Institute of British Architects, Monday, 29th May 1899.

WHEN our Secretary did me the honour to invite me on your behalf to read a Paper on "The Planning and Construction of Board Schools," I felt compelled to undertake the task, although I am obliged to limit the subject to my own experience—viz. the Building work of the London School Board—and it is as well, perhaps, that the Institute should be aware of the varied nature of the buildings required for the purposes of elementary education. It might be supposed that, given a certain number of children to be educated, the requisite number of schools erected in the required spots would meet the want; but when it is considered that the number of children in London coming within the Elementary Education Act, according to the scheduling of 1898, was, between three to five years, 176,030; five to thirteen years, 656,978; and over thirteen years, 56,864, making a total of 889,872, it will be well understood that, although by far the larger proportion of this number are of the ordinarily intelligent and law-abiding type, still there are a large number who have to be provided specially for, from the higher intellectual development, on the one hand, to the mentally and physically defective and incorrigible truant and criminal type on the other.

An account of the building work of the London School Board may therefore be divided into the following heads, under each of which I purpose to give such details as the time at our disposal will allow, viz.:—

I. The Public Elementary School.
   - Sites.
   - Buildings.
   - Warming and ventilation.
   - Furniture.

II. The Higher Grade School.

III. Buildings for Special Instruction.
   - Cookery.
   - Laundry.
   - Domestic economy.
   - Manual training (in wood and metal).
   - Swimming baths.

IV. Mentally and Physically Defective.
   - Feeble-minded.
   - Deaf.
   - Blind.

V. Pupil-Teachers' Centres.

VI. Industrial and Truant Schools.

VII. Divisional Offices.

With regard to the ordinary elementary school, the London Board, with its enormous area of work and requirements, has formulated a standard of its own based on an experience of twenty-five years. When the Board commenced building schools in 1872 there was a very meagre Code of the Education Department as compared with the present, and the building rules were of a most elementary description, illustrated with specimen plans which would not now be recognised, owing to the high standard arrived at since Mr. Robson has been Consulting Architect to the Department. It is therefore not surprising that, as an acutely urgent demand existed for school places in all districts of the metropolis, a large number of schools were erected which, while fulfilling the requirements of their day and time, are now felt to be far short of present-day needs. With these, of course, we have nothing to do; I refer to it as I know there is a feeling abroad that there is extravagance and recklessness of expenditure by the Board, chiefly on the part of those who merely compare the expenditure of the present with the past, without knowing what are the differences in the Code, the number of extra subjects to be provided for, and other matters which could provide a complete answer to such criticism, to say nothing of the enhanced cost of building during the last ten years, a fact with which we, as architects, are only too familiar.

I. THE PUBLIC ELEMENTARY SCHOOL.

SITES AND PLAYGROUNDS.

I may preface this by saying that the School Board are entrusted with Parliamentary powers for scheduling and acquiring such lands as they may require for the various purposes imposed upon them by the Act, subject to the approval of the Education Department. But this does not necessarily mean that they can acquire sites as and how they please. There is frequently strong local opposition to the site they may consider best for the purpose of a new school, which forces them to a site which they would not have chosen preferentially: then, again, considerations of economy prevail to avoid compensation or complication with adjoining owners. Further, there is a standing order of the House of Lords, that any public body demolishing more than a certain number of houses of the working class in one parish in a single session are liable for re-housing. This clause seriously curtails the practicable limits of sites in London proper, as the Board have always avoided responsibilities outside their own functions.

Provided there are no difficulties in the way, the first point that should be taken into consideration is the careful selection of a site. In the crowded districts of London, where streets are narrow and houses thick, the largest schools are necessarily required and the smallest sites obtainable, coupled with the unfortunate fact that there is also less choice available than in the suburbs, where land is cheaper and not so thickly covered. An ideal site to my mind is one of about two acres, rectangular, with the longest side as a street frontage and having a western aspect streetwards. When we come to the description of the building, my preference in this direction will be understood. What should be aimed at for the building is proper provision of light and air, immunity from noise of traffic for the class-rooms, an open playground space of at least 30 superficial feet for each child, and of such a shape that it is available for games such as football for the boys, tennis, &c., for the girls. There is no objection to the girls and infants using the same playground, although with a site such as I have described they can be divided if preferred. It is also important that the site should be selected as level as possible, as in the suburbs occasionally the only unbuilt-on piece of land is of such a contour that the utilisation of it is costly in building and the playground somewhat dangerous, especially in winter-time, to the children using it. Sites of fantastic shapes or presenting acute angles in their boundaries are not good, as they are not entirely useful, and frequently present untidy appearances. In the heart of London and crowded districts of course there is no choice, and the ideal 30-foot minimum of playground cannot be realised in these cases. As, whatever the difficulty, sufficient space to ensure light and air *must* be obtained, the playground question is usually best solved by providing on the ground level for the boys and infants, and putting a flat over the whole top of the building to form a playground for the girls, which should not be enclosed entirely by a wall, but should have either panels filled with iron grilles or some lengths of railing, as otherwise the natural curiosity of the child to see what is beyond might lead to unpleasant, not to say dangerous, consequences. Such playgrounds do not give more than 10 or 12 feet to each child, however. A portion should be roofed in, and, of course, closets provided. In the playgrounds, where sufficiently large, there should be a covered space about 50 or 60 by 18 feet, preferably in an angle, with the sides enclosed, open in front to the sun, and with a seat against the wall at the back. There should also be one or two drinking-taps in each playground, with cups and water laid on direct from the service main, and with slate or asphalte backs to protect the brickwork from soakage. Projecting slabs of stone (millstone grit by preference) should also be built into the walls at intervals for sharpening slate pencils, as otherwise the brickwork is liable to be utilised for this purpose and so become defaced. The position of these stones should be carefully selected to prevent them being used as stepping stones to reach roofs of closets, adjoining property, &c. A few tidy-boxes should also be fixed against the walls, and the children instructed to put the paper therein which is too frequently fluttering about the playgrounds after lunch. The playgrounds should be enclosed with walls about 7 feet high, and the entrances should have iron gates. These are frequently requisitioned to be covered with sheet iron to prevent annoyance from outside, but I must say I prefer to see the playground and buildings through these gates; besides, it frequently happens that there is a better chance of gaining admittance. The best and cheapest material for covering the surface of playgrounds is tar paving (which should be properly drained). All existing trees not in the way of buildings should be carefully preserved and protected. Top playgrounds should be covered with two thicknesses of asphalte to ensure dryness. A house or lodge for the school-keeper should be placed adjacent to one of the entrances, and in as good command of the playgrounds and premises generally as possible. This house should consist of a good-sized living-room, with scullery, yard, and washhouse, and three bedrooms. Houses for teachers, though generally attached to country schools, are never provided by the London Board, as it is considered better on the score of health and their own probable convenience that teachers should live away from their work.

BUILDINGS.

All buildings erected by the Board are paid for with money raised by loan spread over fifty years for repayment, and, as such loan cannot be raised unless recommended by the Education Department, the plans, specifications, and estimates have to conform to the Code and be approved by the Department. Tenders are only accepted by the Board subject to such approval.

The buildings of the Board, although erected under Parliamentary powers, are not exempt from the London Building Act.

Public elementary schools are divided into departments as follow: boys' schools, girls' schools, senior mixed schools, junior mixed schools, infant schools. Where the sites are sufficiently large and level, schools of all one story are usually built—as a rule, a senior mixed school, consisting of class-rooms grouped round a central hall, with an infants' department as a separate building. Another type is to put the boys' and girls' as a two-story building, again with separate infants' school. This type is suitable for a large site where the levels are inconvenient for a one-story school. The majority of sites will only allow for three-story schools, and, where additional accommodation is required in a neighbourhood where there is already a complete school or group of boys', girls', and infants' departments, it is usually provided by acquiring another site and erecting a separate junior mixed or senior mixed department, according to the needs of the district—the junior mixed providing for children between the infants and fully graded, and generally suited to a poor neighbourhood; the senior mixed usually providing for the higher grades, and requiring rooms and facilities for teaching more advanced subjects. I will describe a three-story school as being the most usual type. [See figs. 1 and 2, Cobbold Road School, Chelsea.] The infants are naturally on the ground floor, on a level with their playground, the girls on the first floor, the boys above. The London School Board consider a hall indispensable to every department of a school. Experience has shown that nearly every school built in London has required enlargement. There must naturally, however, be a limit to the size of a school, so that the departments do not become unwieldy. The maximum size or accommodation of a group should not exceed 1,548—in departments of boys 516, girls 516, infants 516—and if further accommodation is required, it should be provided by a separate mixed department (either senior or junior), as already described. On the other hand, if a smaller school is needed to begin with, it is convenient to take the figures named as a maximum and build a portion first, leaving it to be added to as needs arise. Of course the one- and two-story schools can be treated similarly. The hall for this type of school is a very good size at 54 × 30 feet, the class-rooms, ten in number to each department, graduating from sixty to forty in accommodation, thereby providing the necessary elasticity, as the lower standards, requiring the largest class-rooms, are periodically reinforced by drafts from the infants' or junior mixed departments. As the numbers decrease as the higher standards are reached, the Board builds accordingly—one room for forty, two for forty-eight or fifty, and the remaining rooms for fifty-six or sixty will be found convenient. The Board have abandoned the use of sliding partitions, as each class is

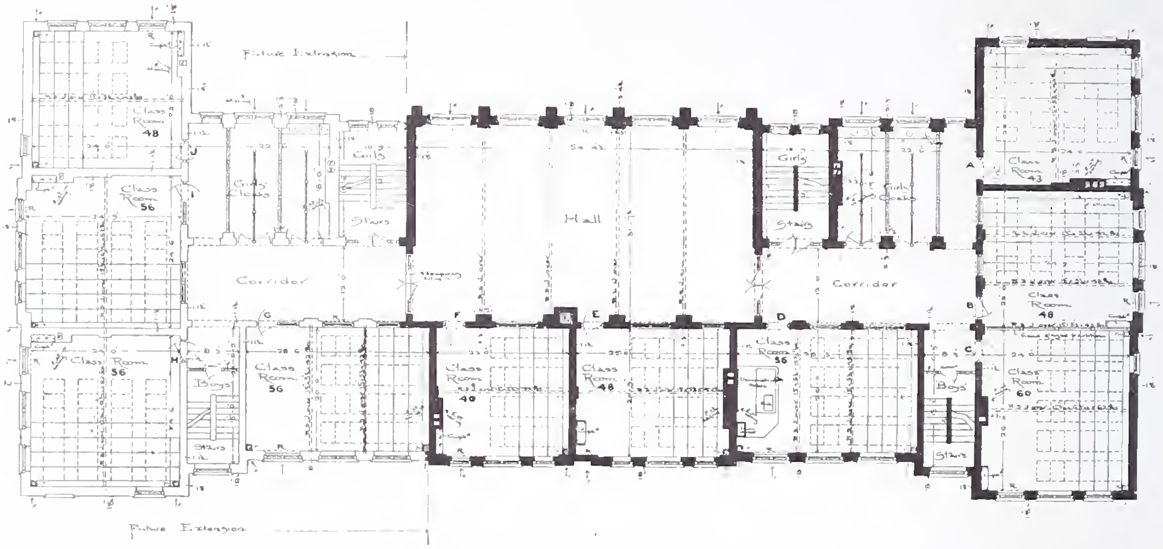


FIG. 1.—COBBOLD ROAD SCHOOL, CHELSEA DIVISION. FIRST FLOOR PLAN (GIRLS').

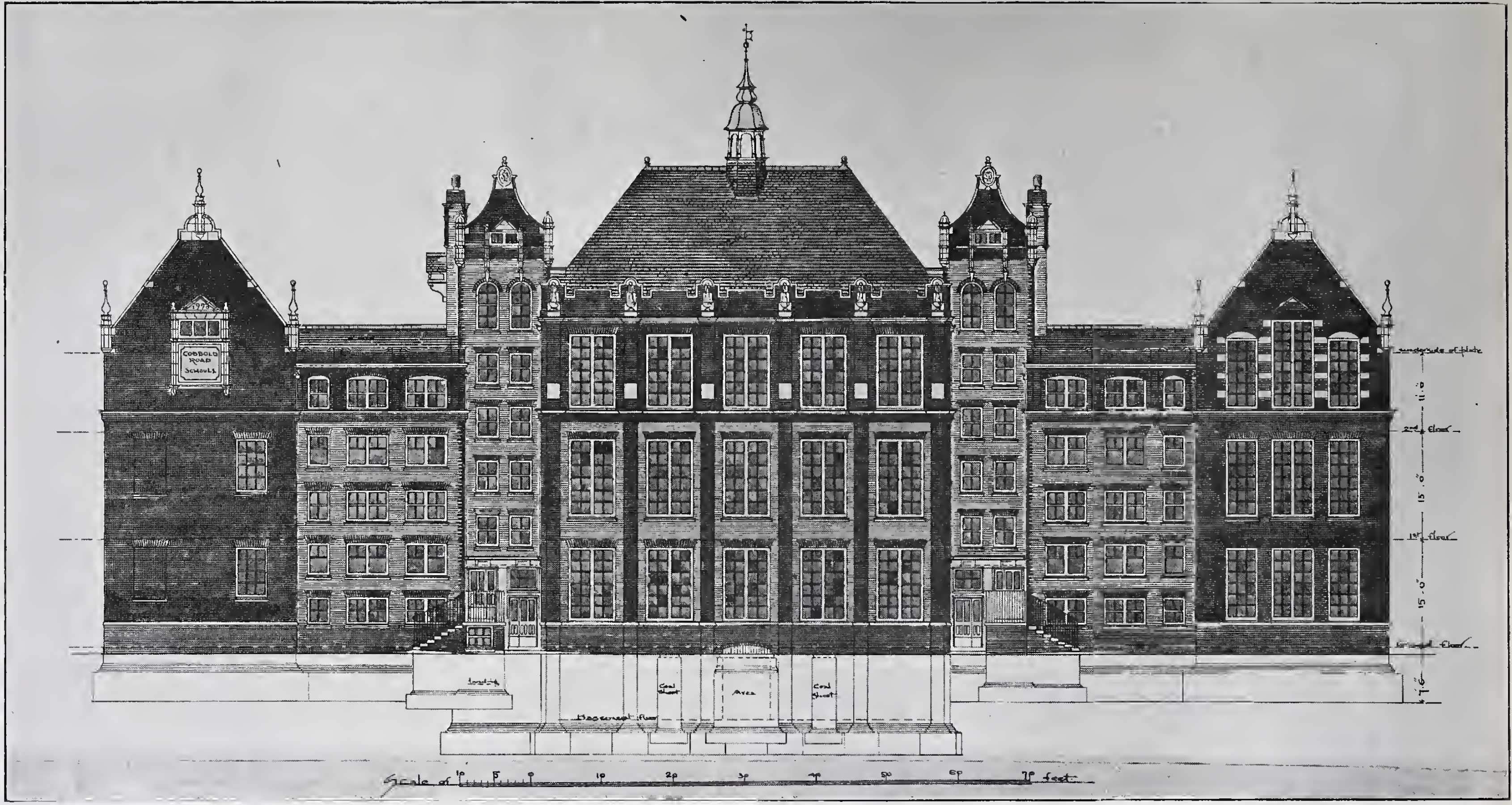


FIG. 2.—COBBOLD ROAD SCHOOL.

self-contained with its own teacher. In an ideal state of things the class-rooms would be full at the same accommodation all through the school, and if that were so they would be all of one size. In every new school a drawing class-room is provided, lighted from one side only (north or east), and provided with water supply, clay box and sink for instruction in modelling, and accessible from both boys' and girls' departments. The main line of class-rooms should, if possible, face the playgrounds rather than a noisy road, and draw their light from the east, as that aspect suns up the rooms in the early morning and does not disturb them for the day. I never build them to the cheerless north if I can avoid it, and the need of lowering the blinds on a sunny side seriously interferes with the lighting; the class-rooms in the wings cannot be so considered, but it would be impracticable and unworkable in a large school to place them all in one line. The hall, facing west, provides a good reservoir of sun-lighted air to help the class-rooms, and, not being seated or reckoned in the accommodation, is a cheerful place into which to march the classes for recreative or collective purposes. Architecturally also, this elevation, being the more broken up (comprising, as it does, the main lighting of the hall, the staircases, cloak, and teachers' room and blocks, and gable ends of wings), is more desirable for a street front than the long unbroken line of class-rooms, though the aspects of the site do not always allow of this.

For a complete school with departments of the above size two staircases for each senior department are required, as also two entrances for the infants on the ground floor. Not more than 300 children should be allowed to each staircase or entrance, and there should be easy access to the staircase landings through swing doors, with no power of fastening, so that, in the event of a panic, the children have an uninterrupted run from their floor to the open playground. The staircases should be not less than 3 feet 9 inches or more than 5 feet wide, with flights not more than seven or eight steps in length, and with ample landing-spaces, without winders; the treads of steps about 13 inches and the risers 6 inches, and with no elaborate nosings to become chipped and disfigured by carrying furniture and heavy goods up and down. The steps may be of the many artificial stones now made, spandril steps with square seatings being preferable, care being taken to select a material that does not wear slippery. The landings are perhaps best of hard York stone. The staircases should be well lighted; the walls should be faced with glazed bricks, and a plain mop-stick handrail provided on each side of the flights, but not round landings. The outer doors at bottom must be made to open outwards as well as inwards. The class-rooms and halls should be 14 or 15 feet clear height, the walls faced with a glazed brick dado and gault or similar bricks above, distempered; the upper hall and corridor floors constructed of iron or steel and concrete, and covered with wood blocks—all hall floors should be strong enough to stand marching and drill and gymnastics without undue vibration. The class-rooms should all be arranged so that the desks receive their daylight from the left, and the furthest desks should not be more than 20 feet from the windows; beyond that there should be subsidiary lighting, preferably at the back. The sills should be 3 feet 6 inches above the floor and the windows extend as high as the ceiling. Above the ground floor these should be fitted with an arrangement by which they can be cleaned entirely from within the room. The doors into halls or corridors should swing both ways or open outwards, and should have the upper panels of glass, so that complete supervision can be ensured. There must be sufficient lock-up cloak-room accommodation provided to give each child on the roll of the school a peg, the rows being two tiers only in height, and the cloak-rooms amply lighted from the ends, with accesses so arranged as to prevent crowding. An air inlet under the windows and the upper panels of doors being wired will ensure a current of air through the room, and there should be a coil of heating-pipes in each cloak-room. At the ends under windows a channel and outlet may be formed in the floor, with a rail fitted across to form a stand for umbrellas. There should be no connection with the class-rooms, but the cloak-rooms should be approached from the corridors. The lavatories are best in a separate room—in the proportion of rather more than one per cent. of basins to the accommodation of the department for boys, and two per cent. for girls and infants. A sink with draw-off tap for cleaning purposes should be provided on each floor, properly protected from misuse. Where the school is of full size there should be one of these at each end of the block. The cloak-rooms and lavatories are best placed in juxtaposition to the staircases, and, as half the height of the story is really sufficient for these when properly ventilated (as they can further be by gratings at their ceiling line on to the staircases furthest from the windows), the intermediate spaces or mezzanine floors can be utilised for rooms for the teachers to retire to during the midday interval. There should be one such good-sized room to each department, say 20 × 16 feet, fitted with hat-pegs and a fixed lavatory basin with supply and waste pipes; and it should be fitted with a small range so that the teachers can cook their lunch if so desired. Each department should also be provided with a lock-up stock-room fitted with shelves. There should be no w.c.'s in the main building for the children, but one or two should be provided for the female teachers. The w.c.'s for the children should be in the open playground, a convenient and reasonable distance from the entrances without being obtrusive, and should *not* be connected by covered ways with the building. The number provided should be two per cent. for the accommodation of the boys and rather more for the girls and infants. Troughs should not be used, but single pans and water-waste preventers. As in London everybody is subject to the various local authorities with regard to their drainage and sanitary arrangements, these are tolerably well known, and there is no need to describe them. The blocks of w.c.'s should be provided with iron gates to protect them from intrusion and damage by unauthorised persons.

WARMING AND VENTILATION.

This is a subject which, perhaps, has not received a sufficient amount of consideration in the past, it having generally been considered sufficient to put a fireplace in each room and rely upon the opening of the windows for a supply of fresh air. We all know the effects of the close atmosphere of a crowded room without proper change of air, and in these days it would be simply criminal to force a large number of children into school where they would be compelled to spend several consecutive hours daily in rooms of this description, to say nothing of the effect on the teachers, who, from my own observation, look jaded and weary after a day's work under such conditions. There is no need to say more to absolutely condemn this system (or rather want of system). It is interesting to notice the efforts which have taken place to improve the ventilation of schools during the last twenty years. Realising the danger of open windows, and that they were frequently not open at all in the winter-time, fresh air shafts (commonly known as Tobin pipes) were introduced for inlet of fresh air, and a separate flue built in the chimney stack with opening at ceiling line for extraction; but I have too frequently found the lid of the fresh air inlet closed, or, where no lid was supplied, books piled upon it, as draughts were complained of; the heat of the room then converts the extract shaft into an inlet with very confusing effects, sometimes resulting in the mouth of *that* also being closed up. It is perhaps needless to add that the introduction of *cold* fresh air from outside brought into a warm room, by whatever method, is fraught with discomfort, and even danger, to its inmates. A system of low-pressure hot-water, with pipes round the walls and just above the floor, where the desks are placed, and a few ventilating radiators bringing in warm fresh air, is very good; but I feel that, even with this system, an open fire in the room is needed, and, for extraction, I do not consider the brick flue simply connecting with the outer air sufficient, as, when the room is warm, it is apt to act as an inlet. I have tried trunks from the ceiling line of each room gathered into groups with a single outlet equal to the combined area of the group, and with a coil of hot pipes in it to produce an upcast. This has the desired effect as far as the ventilation is concerned, but I cannot recommend it for schools of more than one story in height, for where I have adopted it for three-story buildings it has an effect *not* desired, it being found that it conveys the sound from the rooms below to those above, to the disturbance of the classes. The great desideratum in a school is to change the air in the rooms pretty frequently, without producing draughts. In all the cases I have described, the air in winter is not changed sufficiently, and I am afraid the methods employed can only be considered "haphazard" ventilation. It must be remembered that, in public elementary schools, where large numbers of children are crowded together, in many cases their clothes none of the sweetest (nor their habits), the greatest care should be taken to get continued purity of air, and with as little trouble as possible; this can only be attained by changing the air of the rooms eight or ten times an hour, and it would not be possible to live in rooms with such a changing of air going on unless it was almost, if not quite, imperceptible. The system known as the "Plenum" has effected this in the only satisfactory way, so far as I am aware, introducing, as it does, fresh filtered air above the heads of the occupants of the room, warm in winter and cool in summer, and diffusing it over the area and extracting it at the floor level on the same side as the inlet, carrying away with it all the unpleasant odours of damp and evil-smelling garments. The effect on the general spirits of teacher and class is incalculable. Another and great advantage of this system is, that in London and other large towns the noise of traffic, and frequently perhaps the proximity of railways, render closed windows and, in some cases, even double windows necessary, and this emphasises the perfection of this system of ventilation, as there is always a quiet side from which the supply of air can be drawn, and the closed and double windows improve the working. I have also noticed that it is the only system of mechanical warming with which one does not seem to miss the presence of an open fire in the winter season, as, coming into a room with summer temperature and the air as pure and fresh as in summer in the open, it is not looked for. The cost of an installation such as this is not appreciably more, in itself, than an ordinary hot-water installation, but I am bound to say that the builder's work involved in the formation of ducts, flues, &c., is a rather costly item, though, of course, as supplies of water, hot and cold, methods of artificial lighting by gas or electricity cannot be obtained without more or less cost, it can hardly be expected that warm or filtered air can be introduced into a building, circulated and extracted, without costing more in its initial stage than an unsatisfactory and unscientific primitive arrangement. My experience of the cost of fuel for hot-water schemes is that it is not greater than for warming by open fires. I have not had sufficient experience of the "Plenum" system to be able to give you data from my own knowledge on this point, but I may say that the engineering requirements for working and maintenance do not involve more skill than should be expected from the ordinary intelligence of an artisan with a reasonable knowledge of attending to boilers.

FURNITURE.

The pattern of desk proposed to be adopted should of course control the shape of the class-room. It is almost needless to say that the London School Board mainly adopt the dual desks, as they give facility to the teacher to get to the side of every scholar; these are graduated in size to the classes—thus, the smaller size is provided for the larger class-rooms, these being, as before remarked, occupied by the junior children. The desks are always arranged so that they receive their daylight from the left, and the three or four back rows are placed on steps rising four to five inches, the front rows (two to four deep) being on the flat, with the teacher's desk placed on a small platform raised about four inches in front, with a black-board, size 48 inches by 36 inches, affixed to the wall at the left side of the teacher. It has been found that glass blackened at the back is best for this purpose. One good-sized class-room in each (boys' and girls') department should be furnished with a demonstration table, raised on a platform six inches high, fitted with sink with glass front, gas and water laid on, and an evaporation niche provided at side of it on the platform, for teaching elementary physics. Behind this table a panel of cement, six feet by four feet, should be arranged on the wall, with small moulding around, for lantern displays; but, as there is no further available space left on the wall for a black-board, this can be arranged below, with balance weights, to slide up over panel when required. The windows of this room should be fitted with black blinds, to pull up from the bottom in grooves, to keep out all daylight when lantern instruction is given. The stepping for desks in this room should be considerably more than in the ordinary class-rooms, four tiers graduating from six inches to fifteen inches rise; and it will be well if one or two of the class-rooms for the more advanced pupils are fitted with single desks for examination purposes. The School Board are now adopting this for Standards VII. and Ex. VII.

In the infants' department the class-rooms should be fitted with desks corresponding with the junior and senior divisions, into which this department is usually divided, and one room furnished with a Kindergarten gallery for the accommodation of the youngest class. This room should not accommodate more than fifty, and should have roomy flat floor space for marching and games, with easy access to the playground and offices.

All the rooms for teaching boys, girls, or infants should be planned and seated so as to give a minimum of ten feet superficial per child. On the score of health and comfort both for teacher and children, it is quite clear that infants require as much cubic air space as the older children, and this is now recognised by the Education Department, who have agreed to allow the London Board a concession on the building loan to provide for this. About 140 cubic feet for each child should be provided. Each class-room should be provided with a cupboard for daily replenishing from the stock-room.

The halls, not being required for teaching, or rather class purposes, do not require seating, although, where there is a good basement or available space, 200 or 300 light chairs might well be stored for prize distributions, entertainments, &c. It is, of course, possible to hire these, but where a school is very popular, chairs are now so frequently needed that it is well to have them on the premises if practicable, though the hall should not be always cumbered with them. In an ordinary hall of the approximate size already mentioned, there should be a small platform, 5 feet 6 inches by 4 feet 6 inches, about six inches above the floor, on which the head teacher's desk should stand. In the cases of one-story mixed schools where the class-rooms are grouped round a central hall, this latter is naturally much larger, say eighty feet by forty feet, and with these dimensions a more important platform may be provided, designed perhaps to form an architectural feature in the room, raised about 3 feet 6 inches; but I have found that where an ornamental balustrade has been placed in front it has sometimes been objected to on the ground of interference with the view, the teachers frequently liking to organise a display of drill or gymnastics on this platform when an entertainment is given.

A piano is considered to be an advantageous adjunct to the furniture of girls' and infants' departments, for musical drill, singing, marching, and rhythmic movements in the hall.

Each hall should have one or two museum cupboards, about four feet high, with glass doors, for the collection and display of objects of interest which the children may be encouraged to collect, and, as the top forms a shelf for the arrangement of graceful drawing models, &c., they may form a desirable adornment to the hall.

The halls and class-rooms should be fitted with picture-rods for the hanging of the pictures or charts which are supplied by the Board; and, in the class-rooms, a fillet of wood about four inches deep, fixed above the dado round three sides of the room, for the occasional display of the children's work, drawings, &c. I should like here to note that the Board have wisely issued an order to each department of all their schools for a plan of the department to be prepared by the scholars under the direction of the teacher, measured and drawn to a scale of four feet to an inch, the furniture delineated, and the walls coloured in, and submitted to the architect for approval before being framed and hung up in the school. I have had 200 or 300 of these plans before me, and have been much surprised and pleased at the generally high quality of the work. Very few have been returned for revision; some even would have been no discredit to an architect's drawing office. Generally speaking, these plans bear a high testimony to the practical drawing instruction given in the schools, and should produce an interest in buildings too frequently absent on the part of these scholars.

Gas-Lighting.—There is nothing exceptional about the gas-lighting of the schools, beyond saying that in the class-rooms the lighting should be by pendants, not brackets, and so arranged that no child is more than five feet from a burner; about four pendants with three or four arms each are generally found sufficient. The halls are best lighted with five-point star burners; the drawing class-rooms with Wenham lamps arranged for screening for shadows. The question of applying electric lighting to some of the schools is under consideration at the present time.

The number of day schools built and opened by the Board to the 30th November 1898 is 430. A further 45 are projected, of which a good many are now in course of erection or being planned.

II. THE HIGHER GRADE SCHOOLS.

There are a certain number of schools dotted about the Metropolis which receive children whose parents are not satisfied with the cessation of their education at the elementary stage which is all the law insists upon, although the subjects in the Government Code go far beyond these, and encourage their adoption by liberal grants. These schools are equipped with rooms for science teaching in addition to those for art and manual work, which are more general. The rooms for science teaching comprise chemical and physical laboratories, with balance room and small dark room for experiments in photography, and a store for chemicals, also a demonstration and lecture room. The chemical laboratory is usually fitted with benches for twenty to thirty students, a sink, with water and gas supply to each pair of scholars. These benches will be better understood by a reference to the detail drawing, as a description of them would practically mean a specification. There should be a fume closet to each ten students in this room, 2 feet 9 inches by 1 foot 11 inches, supplied with water and gas and flue for extraction. The physical laboratory should have three strong tables fitted with gas, accommodating eight students to each table, and a working bench along one side of the room, with sinks at each end, also a slate shelf for balances, and a cupboard.

The balance-room should have a slate shelf for the balances, with a strong light so that the indexes can be read with facility. Cupboards under this shelf will be found useful.

The demonstration and lecture room should have a gallery with desks for about forty scholars, in good view of the demonstrator's table, fume closet, and lantern panel, as previously described.

These schools are known as Higher Grade schools, and have long been established in some

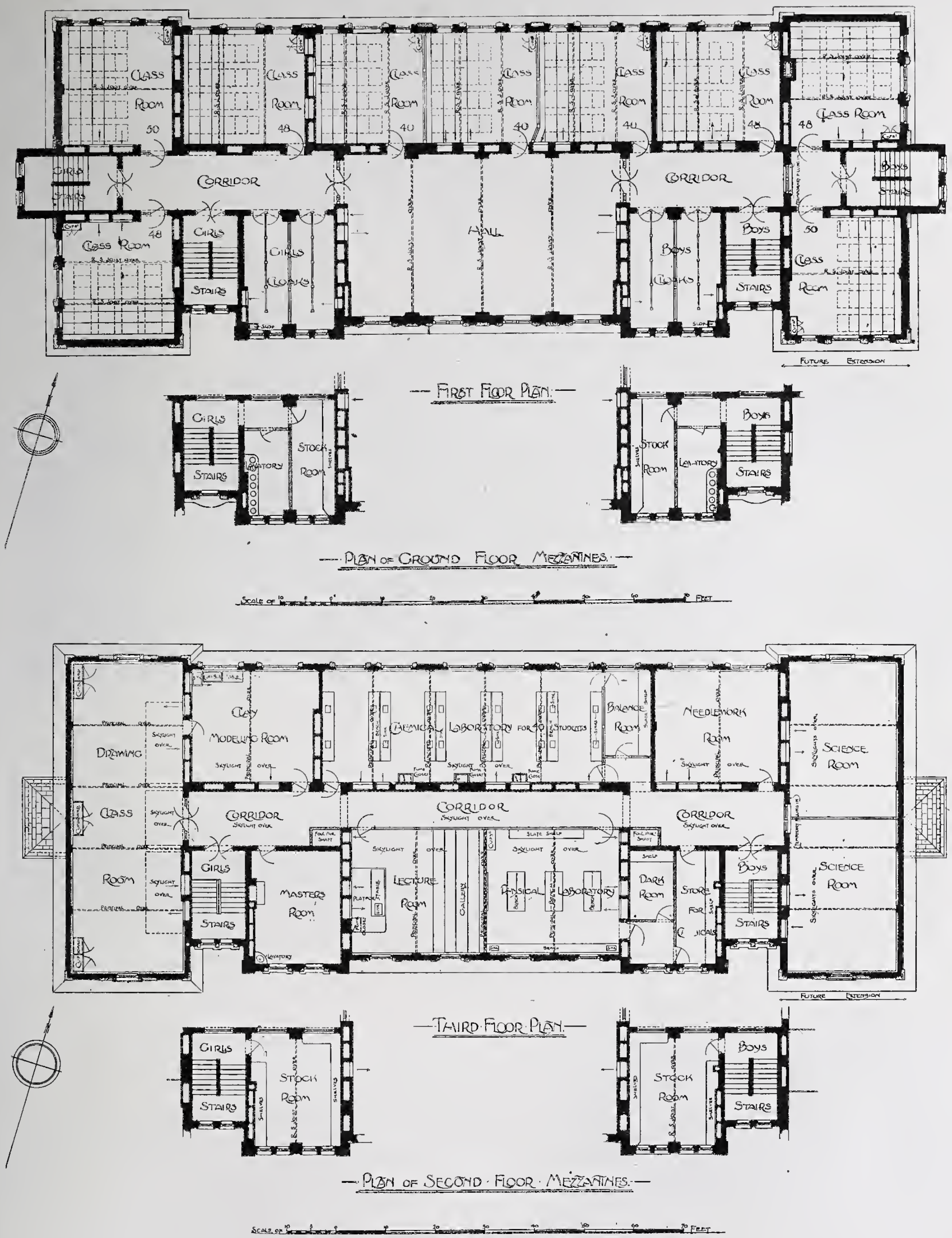


FIG. 3.—CASSLAND ROAD HIGHER GRADE SCHOOL.

of the larger towns in the North—Leeds, I think, being the first—this town having built its Central Higher Grade School some ten years since, Sheffield, I believe, following suit. I went over the Leeds school a short time ago, and although it was considered a very perfect specimen of what these schools should be when it was built, I gathered it is so far behind modern requirements that they would like to pull it down and rebuild it. The London Board have only recently established these schools, adding the necessary additional rooms to existing schools, and, as will be understood, they are schools central to districts or groups of elementary schools, where they are easily accessible to boys and girls who have reached the seventh standard and are prepared to extend their school period. The new schools will be built for boys and girls only, no accommodation for infants being necessary. The classes, being more advanced, are smaller in size, the class-rooms being graduated from 50 to 40; they are so arranged that they can be worked as mixed classes in the class-rooms with separate entrances and exits; cloak-rooms, lavatories, and conveniences as usual. The three illustrations of Cassland Road School, Hackney, will explain the general arrangement. They will be fully provided with halls for examinations, and special class-rooms for science, art, manual, gymnastic, and other training for both boys and girls. There are 44 of these Higher Grade Schools in operation under the London School Board.

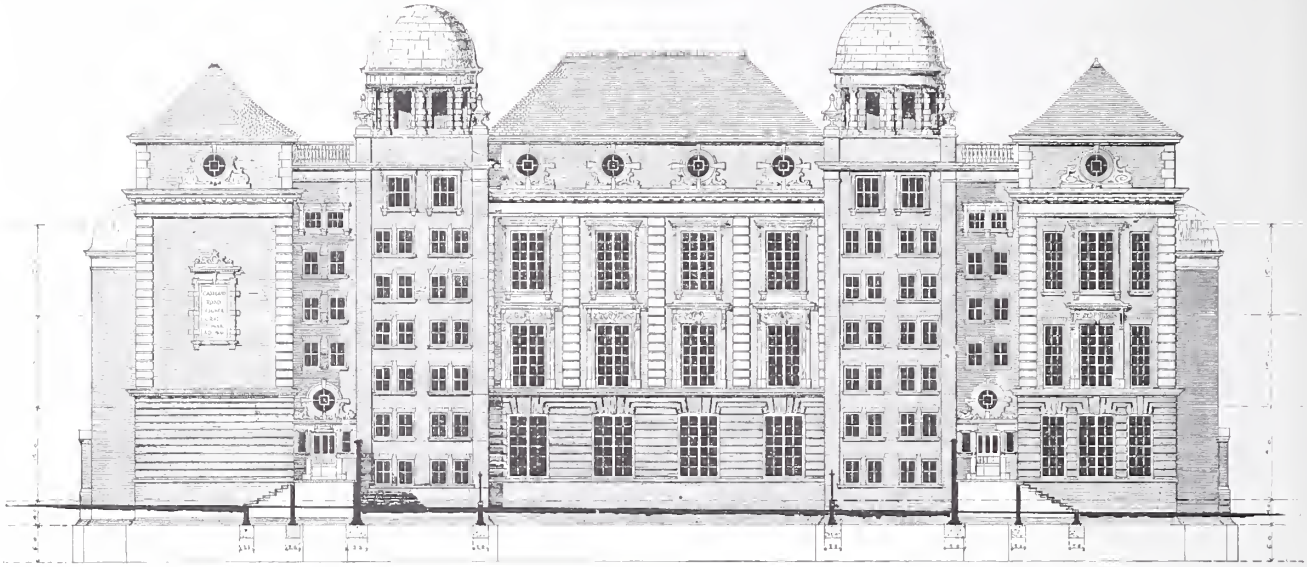


FIG. 4.—CASSLAND ROAD HIGHER GRADE SCHOOL. SOUTH ELEVATION.

III. BUILDINGS FOR SPECIAL INSTRUCTION.

DOMESTIC ECONOMY (COOKERY, LAUNDRYWORK, AND HOUSEWIFERY).

In or about the year 1875 the Board established classes for the teaching of cookery, and for this purpose small kitchens were erected in various centres to accommodate classes of eighteen for teaching, practice, and demonstration. This, as usual, was on a very small scale, and, in fact, the Education Department only allowed £250 on the erection of each kitchen or centre. As the work developed the classes were increased in number, necessitating the rooms being increased in size and adaptability, and the Education Department now allow

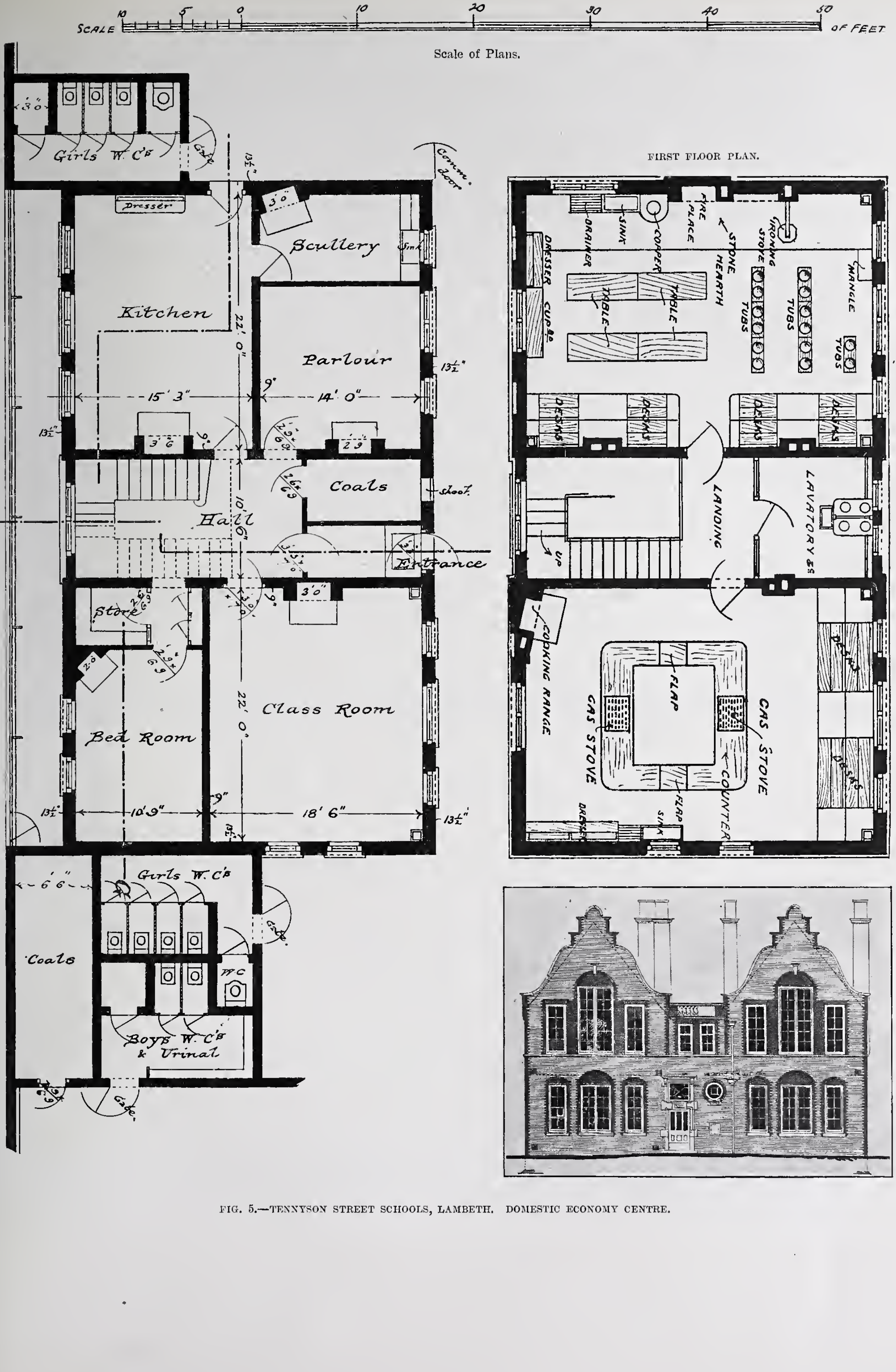


FIG. 5.—TENNYSON STREET SCHOOLS, LAMBETH. DOMESTIC ECONOMY CENTRE.

£500. Fifteen years after starting the teaching of cookery, the Education Department included laundrywork as a Code subject, and centres were established for this instruction in specially built rooms planned for the purpose. At the end of last year there were 163 cookery centres and 108 laundry centres in operation. In many cases the same school was selected as a centre for both cookery and laundrywork, and in these cases two adjoining rooms were usually built with a common entrance. All these rooms have gradually grown in size and capacity to suit the growing requirements of special instructors, inspectors, &c., and in the year 1897 an experimental scheme of instruction in domestic economy, combining cookery, housewifery, and laundrywork, was inaugurated. At this time, the cookery and laundry centres were built with temporary roofs, and sufficiently strong walls to support an upper story for the provision of rooms for the new curriculum should it prove a success. This is now established at six centres, and many others are in an active stage of provision, it having advanced beyond the experimental stage. The combination of subjects has naturally led to the requirement of a building in each case capable of giving proper facilities for the teaching. An illustration is shown of one such typical building. This has been planned after consultation with the committee in charge of these subjects, and the specially qualified lady expert who superintends them. On the ground floor is a class-room 22 feet by 18 feet, seated for a class of forty girls; a kitchen, sitting-room, scullery and bedroom, plainly furnished; an entrance lobby and staircase leading to the laundry and cookery class-rooms on the upper floor, the object being to provide for instruction to girls in general housework in addition to cookery and laundrywork.

MANUAL TRAINING IN WOOD.

With regard to the manual room for woodwork, the best size for this is 60 feet by 22 feet, about 12 feet high, with a store about 10 feet wide partitioned off at one end for wood, and containing a sink and water-tap; there should also be two stoves for heating glue, and racks on the walls for tools, &c. This room will take twenty benches, two boys working at each bench. There should be a small room adjoining the entrance, with two lavatory basins and hat-pegs. The Board have 145 of these centres at work, and 55 more projected.

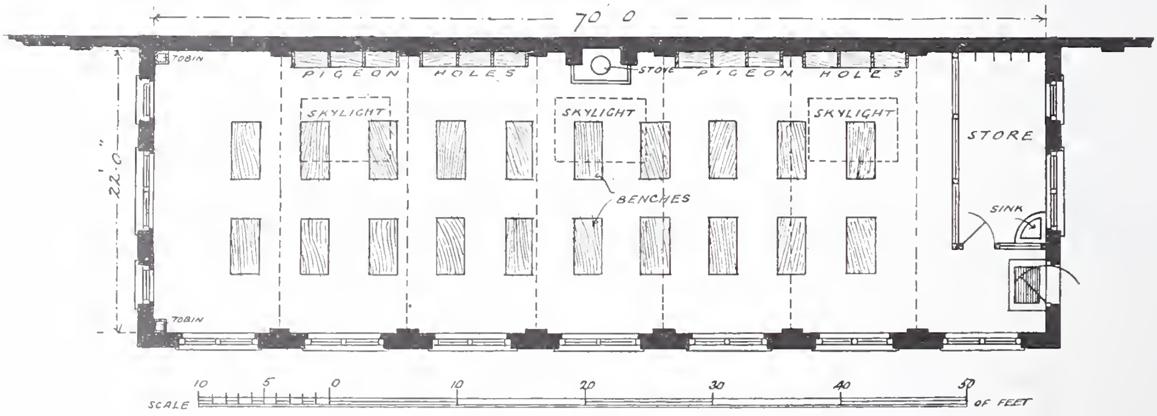


FIG. 6.—PLAN OF MANUAL TRAINING CENTRE.

MANUAL TRAINING IN METAL-WORK.

There is a good centre for metal-work established in connection with the school at Thomas Street, Limehouse, and the work turned out is really remarkable. There is a class of thirty-two boys in a room 68 feet long by 20 feet wide, lighted one side and end. It is fitted with a bench along one side under the windows, with lockers beneath. There is a gas-engine enclosed in the room to drive the machinery, a row of fourteen vices, three lathes, a drilling machine, two forges, three anvils, grindstone, sink, cupboards, desk, &c. The room was fitted up in accordance with the requirements of the very able instructor, who, I think, is perfectly satisfied with it, and certainly produces very high-class results from the intelligent lads under his care. It would be interesting to see this branch further extended, and I am glad to say the Board has had under consideration a proposal to establish another of these centres in the neighbourhood of Greenwich.

All these classes should be in buildings apart from the main school, as disturbance from various causes, such as noise, steam, &c., would be likely to ensue.

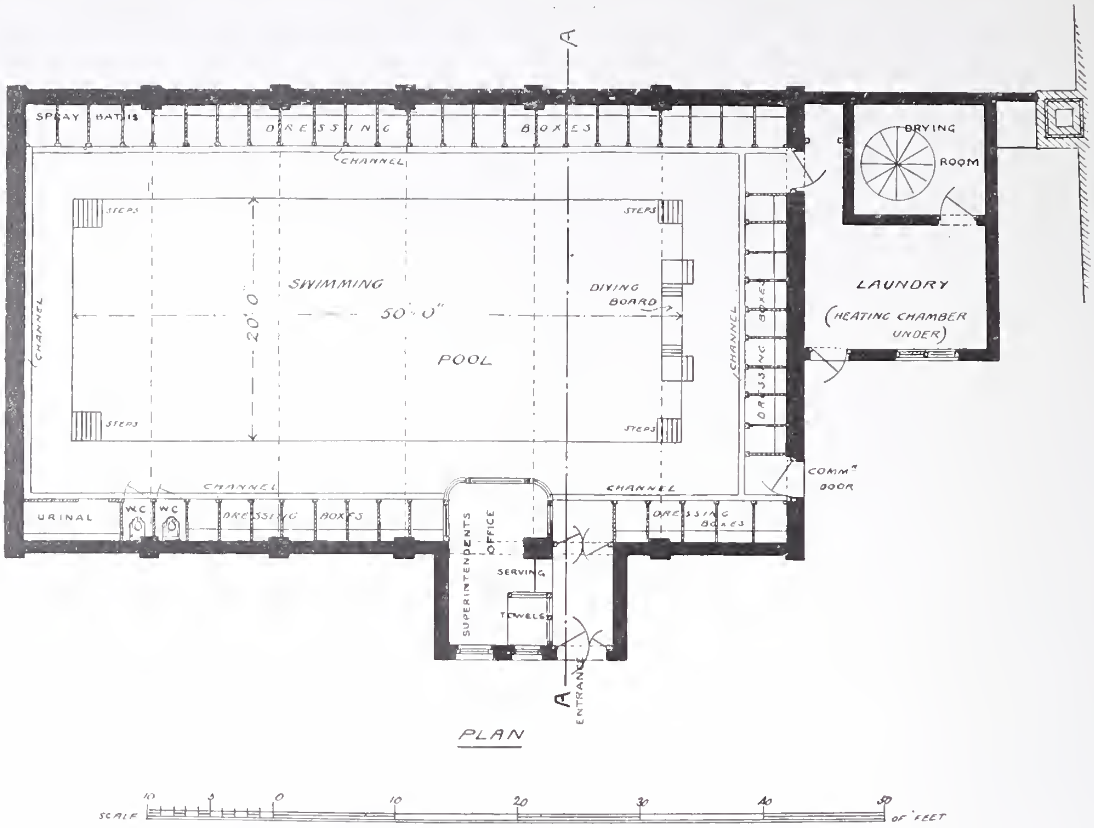
SWIMMING.

With the sanction of the Education Department the Board have decided to establish three swimming-baths in connection with the Schools at Marlborough Street, Southwark; "Hugh Myddelton," Finsbury; and Lyham Road, Brixton. The first of these is on a very small site, and, as the school is raised on arches, the bath is provided under part of the school; it cannot be considered a model, as the circumstances are prohibitive. That at Lyham Road will be a building separate from the school, and, as it will probably be used at separate times, it will have a distinct and separate entrance, with superintendent's office and towel storage. The swimming-pool will be 50 feet by 20 feet, 2 feet 9 inches deep at one end and 5 feet 6 inches at the other, lined with white glazed bricks, and having steps, diving-board and handrail, dressing-boxes—2 feet 6 inches wide and 3 feet 6 inches deep, merely formed as partitions with half-doors—for the children along two sides, and a small number of larger dressing-boxes for teachers' use; four spray-baths, w.c.'s and urinals, the spray baths being considered necessary for cleansing purposes before entering the swimming-pool. Also, in connection with the warming apparatus, a washing and drying room for towels and bathing-dresses. The water will be warmed by the injection of steam round the sides close to the bottom of the bath, the pipes being in chases and cased for protection, this system of heating the water being recommended by the Board's warming engineer.

IV. SCHOOLS FOR THE MENTALLY DEFECTIVE, THE DEAF, AND BLIND.

THE MENTALLY DEFECTIVE.

The School Board, being entrusted with the elementary education of the whole of the children of the Metropolis, has, unhappily, found that a considerable proportion of these children are mentally weak—not being absolute lunatics, who are provided for by other public bodies. As in these cases the mixing with children of normal intellect in school and playground is productive of undesirable effects on both sound and weak, it has been found necessary to provide accommodation for these in specially planned buildings. They are treated as centres drawing their attendance from moderately accessible groups of schools. The unit for class-room in schools of this description is less than that for the ordinary school, as so much more individual attention is required. And the number of class-rooms to each centre varies according to the density of the neighbourhood in which it is erected, four or five being about the average number. These are 20 feet square, and are seated for twenty children. It is important that they should be all on the ground floor, as so many of these imperfectly developed children are cripples physically as well as intellectually. A good hall corridor 15 or 20 feet wide, and as long as the building will allow, well warmed, and made as cheerful as possible, is provided for exercise, drill, &c. The class-rooms for these schools, unlike the



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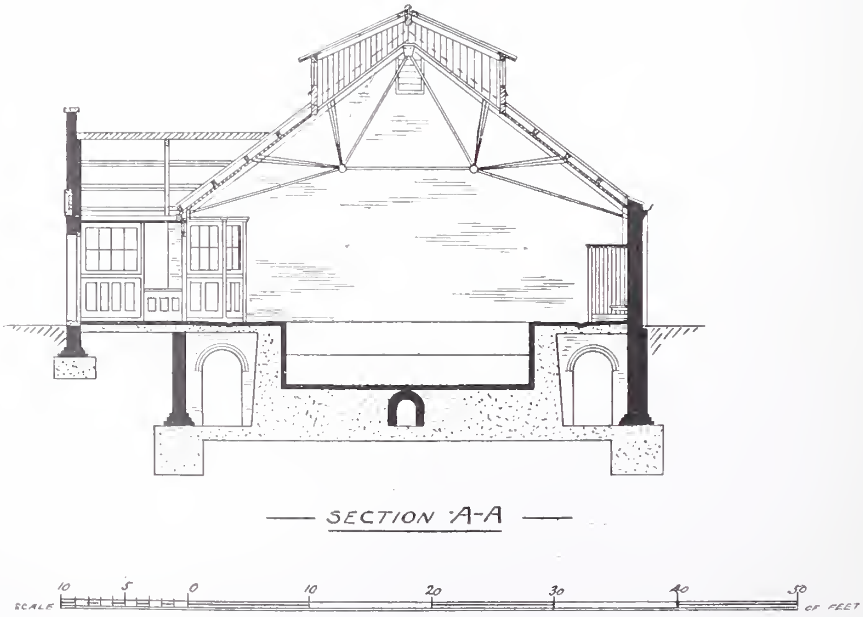


SECTION A-A

FIG. 7.—SWIMMING BATH.

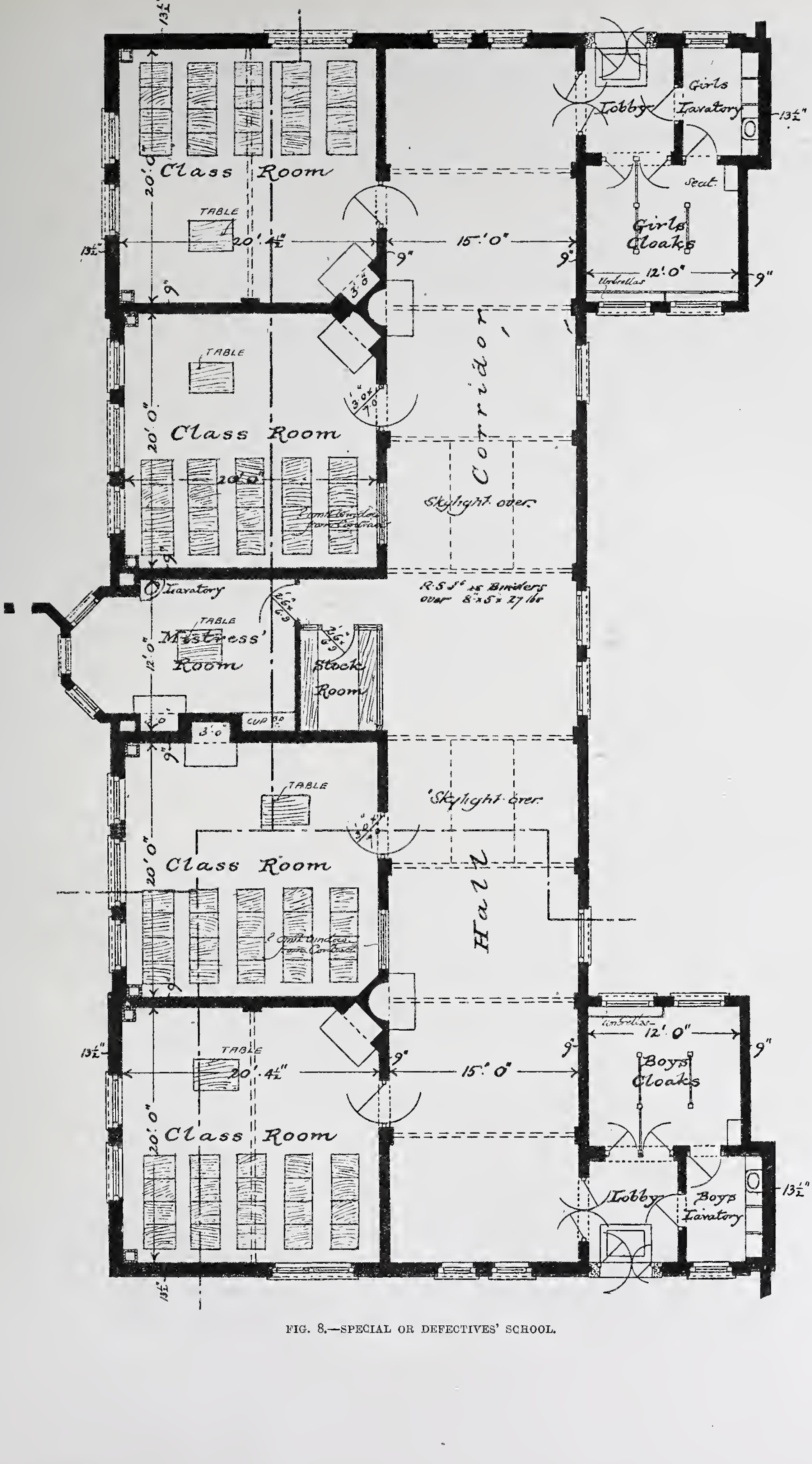


FIG. 8.—SPECIAL OR DEFECTIVES' SCHOOL.

ordinary school, should be so placed as to receive plenty of sun, and should be warmed by open fires. In addition to the indispensable cloak-rooms, baths are provided, as also a good lavatory, boys and girls being frequently taught in mixed classes, but with separate playgrounds and offices. There are thirty-nine of these centres in actual work in London, with 1,597 children on the rolls on the 31st October 1898; and about thirty-five more are either in course of building or immediately contemplated.

THE DEAF.

Provision for what are known as the deaf and dumb also has to be made, although it may here be noted that the Board does not recognise dumbness, their work in the direction of training these children proving to their satisfaction that dumbness is contingent on deafness, and can be greatly minimised, and in many cases practically cured. These schools are also provided on the "centre" system, and are very much on the same plan as the "defective," similar conditions applying. The class-rooms, however, are smaller, 18 feet square, and seated for ten. The method of seating in these rooms is different from the ordinary class-room, being arranged in a circle; and the rooms should have a strong high or top light so that the lips of the children can be watched and studied, they being taught to read what is said by the lip movement. The result is very wonderful, as I have found from my own observation, having had many opportunities of visiting these classes with the late General Moberly, who took a keen interest in all these unfortunates. The Board have seventeen centres in operation, with 513 children on the rolls on the 31st October 1898, and seven in course of provision. The Board and Education Department consider that these centres should, as a rule, consist of four classes, giving a complete course of instruction for junior and senior scholars, as being more effective than a larger number of smaller centres.

Some five years ago the Board determined, in the exercise of their responsibilities, to erect an institution for 150 deaf children at Anerley. This was planned on the cottage system, having five separate cottages for thirty each—three for girls and two for boys—the cottages having day-room and dormitory, with accommodation for the nurse in charge of each. A central block contained school, dining-hall, instruction rooms for various occupations, and quarters for the governor in charge of the whole, committee-rooms, &c., recreation-grounds, drill-hall, swimming-bath, and all accessories. In consequence, however, of a difference with the Education Department, the abandonment of the scheme will probably result. Since this stage the Board have further considered the question, and have applied to the Education Department for authority to establish a home for the boarding and instruction of about forty deaf children who, on account of their mental deficiency, were unsuitable for instruction in the oral classes, and had to be taught on the sign system. To this the Department have consented on the condition that it is built on the cottage-home principle, that the number in each home should not exceed ten, that the sexes should be rigorously separated except for lessons and meals, that the homes should be established outside London, and manual and industrial training should be largely agricultural or horticultural, as on these lines something useful may be done with the children, and that attention should be given to their physical condition from time to time. This scheme will afford a fresh planning problem to be solved in due course.

THE BLIND.

Happily, most of those children of the class for which the School Board provides who are afflicted with this distressing infirmity are reached by some of the institutions which private benevolence, or municipal or other funds have provided. There are, however, a few children in most divisions for whom school accommodation has to be provided. These number about 150 distributed over eight centres, and it is generally sufficient to provide two small class-rooms at each centre with separate entrances, cloak-rooms, and lavatories, the classes being mixed. Separate play-yards and closets are, of course, necessary apart from those of the ordinary school to which the centre is attached.

V. BUILDINGS FOR THE TRAINING OF TEACHERS.

PUPIL-TEACHERS' CENTRES.

In consequence of the large demand for teachers, and the difficulty of meeting such demand, the Board adopted about fourteen years ago the principle of training their own pupil-teachers, and so bringing them up to their service. Like everything else, this departure had small beginnings, and the accommodation in the first cases consisted of a few rooms attached to an ordinary elementary school and specially set apart for this purpose. It was soon found that the facilities provided by this means for science, art, and other teaching was altogether inadequate, and in 1888 the first building expressly designed and erected as a pupil-teachers' centre was opened.

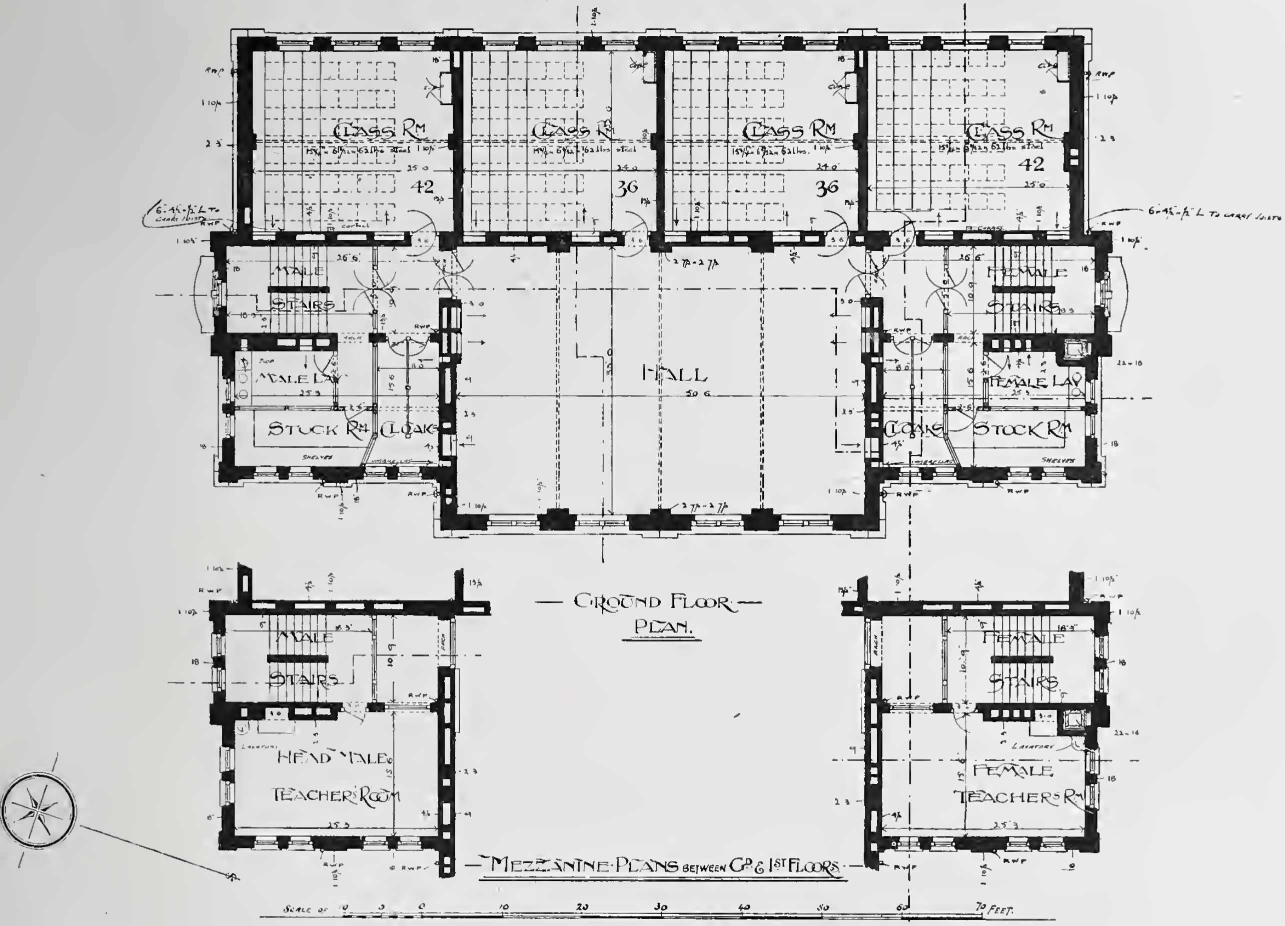


FIG. 9.—FINSBURY PUPIL-TEACHERS' CENTRE, OFFORD ROAD.

It consisted of a three-storey building, comprising, on the ground floor, three class-rooms each for thirty-six mixed pupils, and seated with single desks; a central hall, 44 ft. 6 in. by

30 ft.; separate staircases, lavatories, and cloak-rooms at each end for the two sexes. On the first floor are three class-rooms coinciding with those on the ground floor, whilst over the hall is a chemical laboratory and corridor fitted with lockers for the students. On the top floor is an art room and covered gymnasium, whilst a flat over the laboratory provides an open gymnasium and space for exercises. There are also retiring rooms for the teachers of both sexes, and one for the superintendent in charge of the whole establishment. In view of the experience of ten years, and an enlargement of requirements by the Education and Science and Art Departments, even these provisions have proved to be meagre and insufficient; and now that the system has spread so far beyond what was contemplated at its inception, the Board have found it necessary to replace the first of its ventures in this direction by a properly planned building capable of accommodating the numbers using it, and far in advance of the existing provision, containing as it does rooms for special instruction at present non-existent. On the ground floor are provided four class-rooms for forty-two and thirty-six, two of each, seated with single desks, a central hall 50 ft. 6 in. by 33 ft. 6 in., with staircases, &c., at each end as before described; on the first floor are four class-rooms, and a properly-equipped gymnasium over the hall; on the upper floor an art room (over the

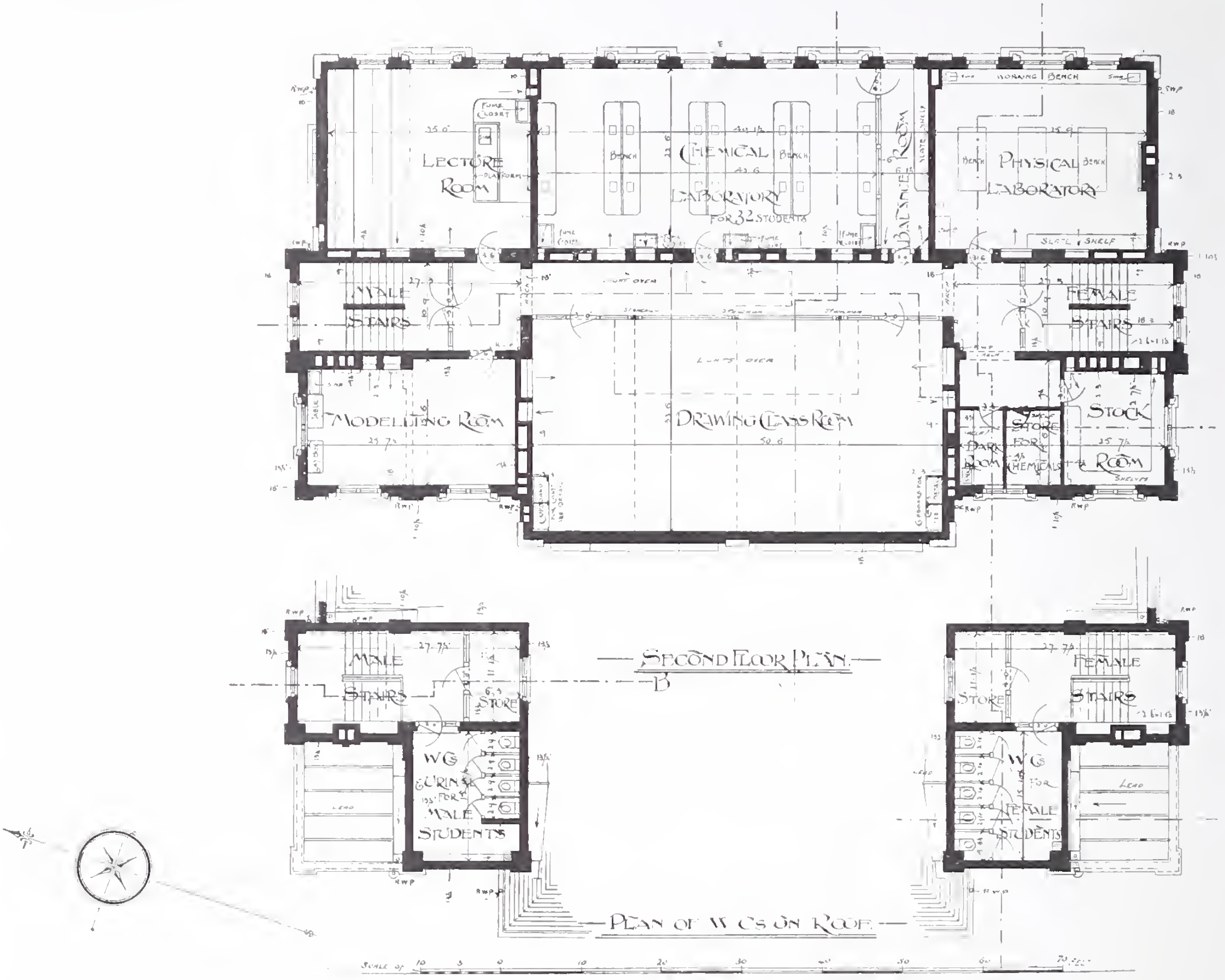


FIG. 10.—FINSBURY PUPIL-TEACHERS' CENTRE, OFFORD ROAD.

gymnasium), the remainder of the floor being devoted to chemical and physical laboratories, lecture-room, balance and dark rooms. A basement is provided for the engineering apparatus, and also a kitchen for the provision of luncheons; a very necessary accessory where numbers of young people spend many hours daily. The site is, happily, large enough to give space for lawn-tennis on the girls' side, and for football on the boys'. This may be fairly considered as a very complete scheme, and may safely be said to embody all that is likely to be required in the future [see figs. 9, 10, 11]. There are twelve pupil-teachers' centres established and at work under the Board. Five of these may be considered inadequate for their purpose, being incorporated with other buildings and generally inconvenient. They will probably be replaced in due course by more modern erections.

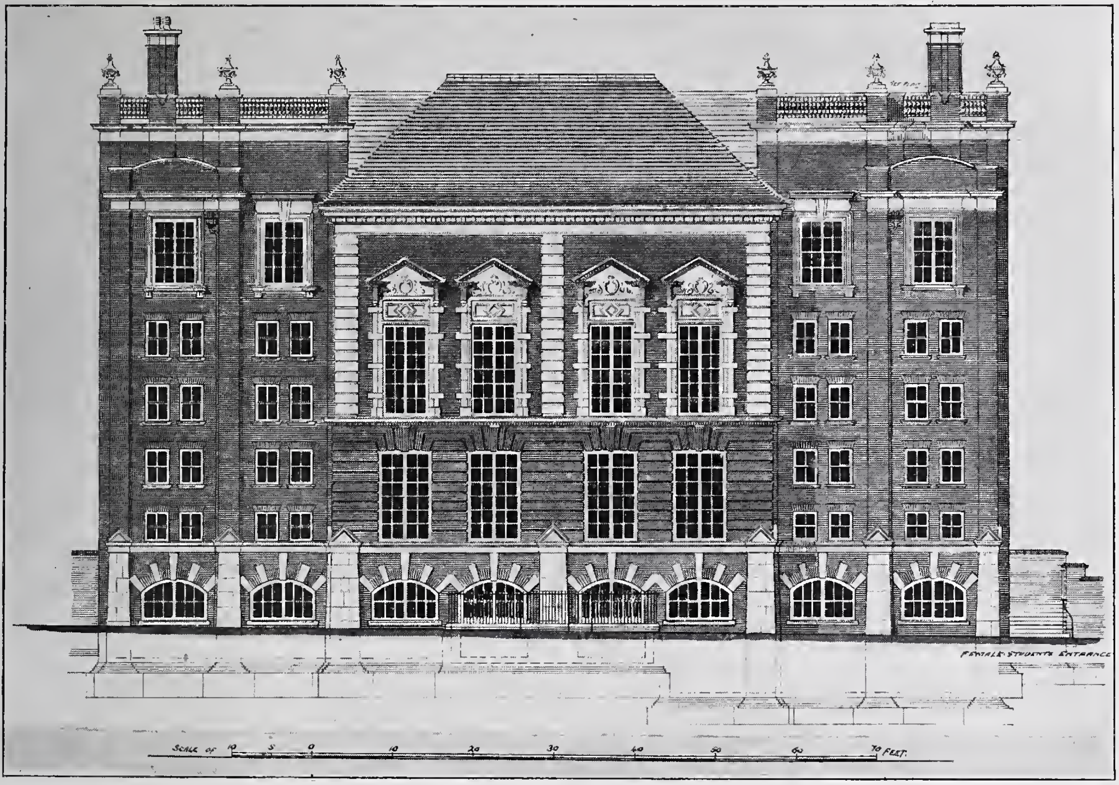


FIG. 11.—OFFORD ROAD PUPIL-TEACHERS' CENTRE.

VI. INDUSTRIAL AND TRUANT SCHOOLS.

The buildings for this purpose must naturally be of an essentially different character from other buildings of the Board, as they are necessarily boarding establishments. The Industrial Schools are occupied by boys or girls who have been charged before a magistrate for offences under the Industrial School Act, and are committed to these schools until the age of 16 is reached.

Truant schools, on the other hand, are tenanted by incorrigible truants who are only admitted for a few months in the hope that a little taste of discipline may have the desired effect of producing a respect for the amenities of law and orderly life. The Board's industrial and truant schools at present consist of the following:

1. *Davenport Hill Boys' Home, Brentwood.*—An adapted building acquired by the Board twenty-five years ago and accommodating 100. But, as it cannot be said to be satisfactory, being far behind modern requirements, the Board are about to substitute a new building.

2. *Drury Lane Day Industrial School.*—Established in a school originally built for ordinary day-school purposes. The character of the neighbourhood changed to such an extent, however, that its dwindling attendance could easily be accommodated in surrounding schools, and the building was adapted as a day industrial school for 200 boys and girls, but not a residential establishment. It was opened in 1895.

3. *Gordon House Girls' Home, Isleworth.*—This is a home for fifty girls committed under the Industrial School Act, and established in a large mansion purchased by the Board on advantageous terms and adapted for its new tenants; opened in 1897.

4. *Highbury Truant School.*—A disused building purchased by the Board and adapted for the accommodation of 200 boys; opened in 1891.

5. *"Shaftesbury" Training Ship.*—Established in 1878, stationed off Grays, and accommodating 500 boys. In connection with this the Board have recently erected an infirmary and observation building on land adjoining, it being considered desirable when boys are committed to the ship to isolate them from the main body for a week or two in case of their developing infectious complaints. The observation building contains two wards—one of four beds, the other of two, with room and scullery for use of nurse attendant. The infirmary building consists of receiving ward, disinfecting chamber, three dormitories of six, five, and three beds respectively, with bath-rooms and sanitary necessaries, dispensary, store, living-room, bed-rooms, and kitchen for nurse attendants. The dormitories are all warmed by open fires, and have inlet and extract flues for change of air.

6. *Upton House Truant School.*—This is the only building as yet erected specially for the purpose. It is a four-story building for 140 boys, comprising, on the ground floor, dining-hall, school and class rooms, lavatory, dressing and bath-rooms, officers' quarters, a large kitchen with steam cooking apparatus and accessories, a reception, disinfecting, bath, and dressing room for the boys, and (in separate buildings) a laundry and infirmary with four wards, nurses' accommodation, day-rooms, &c.; on the first floor of the main building are two dormitories for thirty and twenty beds respectively, containing about 540 cubic feet of space to each bed, properly supervised from masters' bedrooms; on the second floor there is similar accommodation; and on the top floor are two dormitories for twenty each, two punishment cells, with w.c.'s and bath-rooms on each landing. There are a large recreation-ground, drill-shed, and work-room for industrial occupations. A swimming-bath is about to be added.

7. The Board are negotiating for a large site of some 15 acres in a locality in the neighbourhood of London for the purpose of erecting two establishments—an industrial school for about 120 boys, to take the place of the Davenport Hill Boys' Home, and a truant school for about the same number. These two institutions will be entirely separate as far as their occupation and management are concerned, but will probably be under the control of one superintendent and body of managers. The building is planned as a square block enclosing a courtyard about 146 ft. by 94 ft., divided for the two occupations. The east and west sides, three stories high, are allotted to the separate use of the industrial and truant schools respectively, and contain dining-hall, kitchen, and accessorial apartments; on the upper floors, dormitories and bed-rooms for the masters in charge. The connecting side of the square to the front or south contains the entrances, reception wards, governor's office, waiting-rooms, and covered connecting passage from side to side. Over this will be the committee-room and the superintendent's quarters. On

the north side the connecting block will comprise class-rooms on each side of a drill-shed, over which will be a large hall, about 80 feet by 32 feet, in which examinations, functions, &c., can be held. At the rear are the lavatories, dressing-rooms, swimming-bath, workshops, &c., and, separated by a yard, the laundries, drying-rooms, and necessary buildings for this purpose. On the site will also be erected an infirmary and observation building for each institution. A large cricket field and recreation-ground, common to both, are also secured. Buildings of this nature can only be erected subject to the approval of the plans by the Home Office ; the Board are therefore compelled strictly to conform to their requirements, and are precluded from limiting their expenditure for accommodation to what *they* might consider sufficient from an economical point.

VII. DIVISIONAL OFFICES.

For the purposes of the administrative work of the Board, London is divided into eleven divisions as follows—City, Chelsea, Finsbury, Greenwich, Hackney, East Lambeth, West Lambeth, Marylebone, Southwark, and Tower Hamlets.

A description of the building work of the London School Board would not be complete without a reference to the buildings for offices for each of the above-named divisions. The requirements for scheduling the children in each division year by year necessitate the employment of an army of visitors under a superintendent, whose duty it is to see that proper attendance is made at school and that school-places are projected where they are deficient. In addition to this, the several schools, when built, are placed under groups of voluntary managers, an official correspondent with the necessary clerical staff being required for each division ; and it is also necessary that there should be a local headquarters for these, who are, for convenience, generally placed under the same roof. A typical block is now in course of erection in the Peckham Road for the East Lambeth Division—on the ground floor is the entrance hall, a large room 57 feet by 22 feet for the visitors to perform their clerical work, a room for the assistant-superintendent, and an office for the check clerk, also the lavatories, w.c.'s, &c. ; on the first floor a committee-room, used also by the superintendent, and a clerks' office ; on the second floor the correspondents' and clerks' offices, and caretaker above.

GENERAL.

In conclusion, I may be expected to say a word on the subject of the cost of the schools, and I shall confine myself to the actual ascertained cost of an ordinary day school. As a typical case, the Princess May Road School, Kingsland, tenders for which were received on March 20 of the present year, may be cited, so that we have it " up to date." This building was planned as a complete school of three stories for 1,548 children, on a site of about 1¼ acre ; a portion, containing accommodation for 916 and including the halls, art room, and other expensive accessories, forming the first contract, and the lowest tender working out at £15 15*s.* 6*d.* per head for the main building, and about 8½*d.* per foot cube. When the school is completed for the full number, the cost per head will be reduced to £13 18*s.* 4*d.* per head, calculating it on the same basis. This amount includes for building the whole of the brickwork in cement, also the provision of glazed bricks to staircases, corridors, and dados of class-rooms and halls, but does not include furniture. A building of three class-rooms for sixty children, and hall, for defectives, is also provided on the site at a cost of about £2,000. The cost of enclosing the whole site with walls and railings, tar-paving, drainage, and provision for deep foundations below a normal depth of 6 feet is about £5,000 more.

The Education Department have a veto on the estimated cost of the schools, and limit their allowance of expenditure (or loan) to £10 per head on the accommodation as seated for in the class-rooms, with an additional £1 per superficial foot floor space for the halls, and from 15*s.* to £1 per foot for other rooms for special teaching; also an allowance for the extra cost of glazed brick internal facings on the score of saving in maintenance. In addition, extra allowances are granted for enclosing, paving, and draining the sites and for deep foundations, which are almost always necessary in London. But the Board are expected to keep the cost of furniture and superintendence within the £10 limit. The Princess May School just quoted is being built for about £750 within the limit allowed.

The Board have from time to time gone carefully into the subject of cost, and many suggestions for cheapening have been made, but, as the Board have never been content to forego any of their requirements, and properly have not been disposed to relax the standard of high quality of work, all this has to be paid for, and, bearing in mind the state of the labour market and cost of materials as compared with that of, say, ten years ago, it is not surprising that schools, like other buildings, do not get cheaper. There was a suggestion a few years back that unnecessary expenditure was incurred on architectural adornment, and the committee dealing with this branch of the work ordered two or three schools to be built of stock bricks and slate roofs, with no architectural features about them. Then it was found that the difference of cost between bare utilitarianism and buildings designed in some sort of style and regard for materials and colour was rather less than 5 per cent., and I venture to say there are few members of the Board who would be prepared to make such a sacrifice to effect so trivial a saving; nor would they, I think, have the sympathy of the Institute in doing so, considering that the schools are educational public buildings erected on freehold sites. Besides, they can hardly be accused of extravagance on this head while they keep within the limits of the Education Department.

DISCUSSION OF MR. BAILEY'S PAPER.

Professor AITCHISON, R.A., *President*, in the Chair.

Prior to the reading of the Paper the following letter was read from LORD REAY, Chairman of the London School Board, who had been furnished with an advance proof of the Paper:—

6 Great Stanhope Street, W.: May 23rd 1899.

SIR,—I much regret that I cannot attend the Meeting on May 29th, as I am going abroad.

Mr. Bailey's Paper is of great interest to architects and educationists, and deserves to be widely read and translated into foreign languages, as it is sure to attract the attention of foreign educationists.

Mr. Bailey speaks with authority. The building operations of the London School Board are on such a large scale, the problems which have to be solved are so varied, they have been so carefully considered by a number of experts, that Mr. Bailey's admirable review of this branch of the School Board's work cannot fail to meet with the full recognition due to the care with which it has been written.—Your obedient servant,

The Secretary R.I.B.A. REAY.

THE HON. E. LYULPH STANLEY (Vice-Chairman of the London School Board) said he had not expected to be called upon to address a meeting of architects on a question of architecture, but as all that Mr. Bailey had recounted to them was a matter with which he (the speaker) was very familiar, having been associated with Mr. Bailey for a great many years, his only doubt was whether, in the compression that was necessary to bring so many matters into the space of a Paper, even architects could fully follow all that was implied by the Paper. To build a public elementary school was a matter which could not be approached simply by architectural skill and knowledge, because the conditions were very special. The architect had to follow the policy of the particular School Board or other managers of schools who employed him. An architect, thoroughly to know what a school ought to be, should be familiar with what had to be done in a school. Just as an engineer in planning works had to consider the business of the man whose works he was putting up, so an architect in planning a school was planning a building of quite a technical character, and the exigencies of his work must follow the requirements of his employer. If, for instance, it was intended to employ a considerable number of pupil teachers, or other teachers of that type, the school would have to be planned somewhat differently from a school in which all the teachers were thoroughly competent and fit to be trusted with classes apart. Mr. Bailey had given a description of what sort of a building should be planned for the instruction of pupil teachers. There, too, the way in which the School Board or other managers intended to teach their pupil teachers would be the policy the architect must follow; and therefore, although Mr. Bailey had laid down a great many propositions as to what was best and most desirable, at the same time, in some things, his idea of what was best must have been limited by the parsimony of his employers. For instance, in describing what a class-room should be, he mentioned that he would put glazed bricks as high as the dado, and then above that he would have the wall of some ordinary type of brick. Now, a provincial School Board, say Liverpool or Birmingham, would probably demand that the walls should be thoroughly finished with plaster, not left in the rough brick; therefore he did not think because Mr. Bailey, working for very economical, not to say parsimonious, employers, had indicated certain roughness and want of finish in the building, that that really indicated the type of building an architect free to advise his employer would consider was the proper way of finishing his building. He had not the slightest doubt that, however good the bricks, they must be somewhat rough, and if they were left uncovered, dust and possibly even germs of infection would collect; whereas if the wall had a smooth surface it was easily cleaned and was less likely to harbour dust. He agreed with Mr. Bailey that the furthest scholars ought not to be more than 20 feet or 22 feet from the windows, getting their light from the left; but Mr. Bailey had not mentioned in how many of these matters the School Board for London had had to carry these educational points almost by force against the Education Department. Only quite recently the Board had been invited to make their furthest row of seats some 24 feet from the light. There were many things in the Code and in the rules of planning which had at length come to be considered axiomatic by the Department, but this had not always been so. In the first set of schools the Board submitted to the Department where the class-rooms had side lighting, those plans were in the first instance returned by the Department because their rules were violated; and though the Board called the attention of the Department to the fact that if the class-rooms were planned according to the requisition of the Department, they would have back lighting or front lighting, and not side lighting, at last they got the plans passed, with a warning that it was not to be taken as a precedent. With regard to the use of halls in dealing with the discipline and education of children, that was a school-manager's question, not an architect's. There was not the slightest doubt that if a room was to be used for one purpose, it had better be constructed for that purpose; they should not attempt to make it answer some other purpose. In the interest, however, of supposed economy the Department sometimes suggested that they should put a class in the hall. It would be apparent to architects how bad it was to have a class in a room, some 50 feet by 30, which was used as a passage for children going to and from the various class-rooms. Apart from that, it put a great strain upon the voice of the teacher. Although in such matters the Board usually got their way, they got it with trouble and friction, which was a very serious drawback to a public body discharging a very responsible duty. Mr. Bailey, in his desire to cover the whole ground, may have given an excessive impression of the importance of some branches of the Board's work which were only subsidiary. For instance, the building of such institutions as truant schools and industrial schools was not the ordinary work of the Board, but merely incident to it. Architects, in considering a school plan, should concentrate their attention first and foremost upon the arrangement of the class-rooms. There were many disputed questions in school planning. Mr. Bailey spoke about the stepping of the floors, but experts were not at all agreed as to whether the floors of the class-rooms should be stepped or not, and whether the platform from which the teacher delivered instruction should not be raised and the floor flat. On the Continent, where people were supposed to have paid much more attention to school planning than in England, the rule was against stepping a floor; and a great expert in school management—Mr. McCarthy, Chairman of the Birmingham School Board, and also Head Master of a Secondary School—was against stepping the floor. In the higher grade school at Brighton he noticed that they had scrupulously abstained from stepping the floors. These things could not be treated as questions absolutely decided; but such questions as the size of a class-room and the cubic content depended very much upon the rapidity with which the air could be changed. A large room in which the air was not often changed might be much closer and more unwholesome than a moderate-sized room in which the air was not often changed. There was not the slightest doubt that for the facility of a class seeing the blackboard, and for the diminution of the strain upon the teacher's voice, and for lighting the room quite to the back from the windows, it was not desirable to make the class-room a bit larger than was absolutely necessary for the health of the children. Teaching was much more pleasantly conducted in a moderate-sized room than in a large one; but they must have air. The system of ventilation by impulsion was a fine system if properly carried out, and in some places he had seen it very well carried out; but unless they got a really good man, and unless they were prepared to spend a considerable sum of money in extensive tunnels and underground corridors, they might either have the draught too violent or else insufficient, or be disturbed by the noise and vibration from the too great speed of the engine. An architect building a school should be extremely careful with these new methods; he should not be satisfied with a guarantee from the maker, or with some theoretical scheme that seemed satisfactory; there should be a careful examination and testing of the system before it is adopted. Mr. Bailey, he thought, had not fully brought out the importance of varying the size of the class-rooms. The work of teaching in the more advanced classes made smaller class-rooms necessary for the higher divisions, in order to lessen the strain on the teacher. There had been days when the Education Department recognised in its Code a class of eighty, and in those days an economical School Board built class-rooms for eighty. One result of planning schools in that way in the earlier days was that, now that people had a higher idea of what was due to the teaching of children, a certain amount of space was wasted. Fifty children, for instance, were put into a class-room originally planned for sixty, with the result that ten places had to be written off and were unavailable. But coming back to his former proposition: it was policy that determined plan, and it was not the architect who determined the policy; it was the Education Department, or the particular Board who employed him, and the public opinion of the country. Still, if architects made themselves familiar with the requirements of school planning, they could make recommendations to the Board when they were called in, and their influence might do something to educate the Board who employed them. He hoped architects would make themselves, as far as possible, acquainted with these questions, so that they might bring their influence to bear in the direction he had indicated.

Mr. C. J. DAWSON (Head Master of the Aldenham Street School, St. Pancras), who rose at the invitation of the President, said he could only speak as a teacher in one of the Board schools, a building which certainly was not designed on the plans described in the Paper, as it had nearly all the defects which Mr. Bailey said should be guarded against. The subject was one that appealed to everyone interested in education, and especially to teachers, who had to work in the buildings planned for them. He appreciated what Mr. Stanley had said about the need of adapting the building to the exact requirements; and it was important, from a teacher's point of view at any rate, that the requirements should be framed in accordance with possibilities—the possibilities, that is to say, of what a teacher could do. In the building he was constantly engaged in there was one large room that accommodated over eighty scholars, according to the dimensions laid down in the Code, and it was only separated from another room by a sliding partition—the other room accommodating sixty; so that it was practically a large room for 140, separated by a sliding partition. Two other rooms at each end of the building were also separated partly by slight walls and partly by sliding partitions, and those accommodated rather over forty each. If they were taken together they were very inconvenient, and too large for a teacher properly to manage; and if they were taken separately the classes were smaller than the Board and the Education Department required to be placed under the control of a single teacher. The question of ventilating and warming was a combined question, because if scientific principles could be thoroughly applied, there should be a system possible by which the warming should help the ventilation and the ventilation assist the warming, in one way, for example, by supplying cool air in the summer-time and warmer air in the winter. If the system referred to by Mr. Bailey fulfilled all that was claimed for it, it ought to be put into operation in every school where it was possible, and, at all events, in every new school, unless the cost was so large as to be utterly prohibitive. But in many schools he was acquainted with the ventilation by the system provided was an entire failure. The only way fresh air could be obtained in many of the buildings was by opening the windows wide, and that in winter time was a source of danger both to the children and the teachers. Teaching in a class-room which interfered with the voice production, or in a room with a cold draught, was the cause of much of the voice trouble that teachers suffered from.

The PRESIDENT said they were very much obliged to Mr. Dawson for his remarks. Any remarks that he would favour them with on the size of the rooms and the number of scholars that could be properly accommodated in them would be interesting and useful to architects.

Mr. DAWSON said he thought Mr. Stanley had given the main points with regard to the size of the rooms, the arrangement of the light—which should come from the left-hand side—that no one should be seated too far from the light, and that there should be no dark corners. That was a very important point, both for the sake of the teacher and the scholar and on the ground of discipline. In his own school there were corners where the light from the windows did not reach at all, and the children could not see properly there, so that a part of the room was wasted which could have been utilised if the light had been better distributed. With regard to the size of the rooms, Mr. Stanley had called attention to a very important point, namely, that the rooms should not be larger than was absolutely necessary for the health of the children and to permit of sufficient air-space. That was an important consideration also from the point of view of the teacher's voice. It was very wearing indeed for a teacher giving oral lessons, such as were required in science teaching or object lessons, if the voice had to be sent into different parts of a room often not well adapted for sound. Nothing had been said about the acoustic properties of rooms where teaching had to go on. Sometimes the rooms in a school were not at all well adapted for sound. He did not understand the principles of construction which would make the sound more effective, but before he came under the London School Board he had had to manage the whole of a school in a large room, over 60 feet by 30 feet, and fully 20 feet high. Several classes were taught in that one large room, and the echoes were so confusing that it was a very great strain upon the teachers' voices, and yet they had a difficulty in making themselves heard distinctly by the scholars. The time of those large rooms seemed to have passed, and the class-room system was now generally adopted in the newer schools. This matter of acoustics certainly affected the question referred to by Mr. Stanley as to classes being held in school halls. In such cases the voice of the teacher was carried round and up by the ceiling, and was lost to the scholars, and raising the voice very often made matters worse by increasing the echoes. It was very difficult to pitch the voice so as not to produce confusing echoes in a room of that sort, and the fact that the class only occupied one-fourth of the room made it worse. If the room were full it would be less difficult to make the voice heard all over it than if only a small portion of it were occupied and the rest empty.

Mr. E. W. MOUNTFORD [*F.*] proposed a vote of thanks to Mr. Bailey for his very useful Paper. They were greatly indebted to him for having laid bare all the secrets that he had been putting into practice for so many years. He had this advantage over most of them—that he need not fear competition in his particular class of work, because, owing to the policy of the School Board for London, no one else was allowed to compete with him. It struck him, in listening to Mr. Bailey's paper, that he must be dreadfully overworked; they heard of these hundreds of schools being built in the last few years, and of the large number that were coming on, and for Mr. Bailey's own welfare it seemed advisable that some of the work might be given to other architects. What had interested him most was the reference to the warming and ventilation of the buildings. Only five or six years ago some plans of his had to go before the late Mr. Ewan Christian, acting on behalf of the Charity Commissioners, and he, with the later buildings of the Board before his eyes, absolutely refused to allow any kind of mechanical ventilation to be put into the building. Mr. Christian said he had recently examined, at the request of the Board, some of the London schools, and had come to the conclusion that there was nothing in the way of ventilation to equal windows. Windows that went up to the ceiling and opened at the top provided absolutely the best ventilation that could be got. Acting on his command, he (the speaker) had to cut out his system of ventilation, and he had been more or less abused for several years past in consequence. The "Plenum" system, which Mr. Bailey seemed to favour, was probably the best system; but he should like to hear his opinion of that system in, say, ten years' time. Only quite lately several members of the Institute Council were taken over a large building in Birmingham which had recently been fitted with this system, and he had been struck with the considerable accumulation of very black dust in the ducts through which the warmed air was forced into the various wards. Now, that dust represented simply the thicker and heavier particles which the fans had not been able to force into the wards, and it seemed an absolute certainty that a great deal of finer dust had been forced into the wards and swallowed by the patients. In a new building there was not much objection to that, possibly; but as time went on and soot accumulated, more and more would be forced into the lungs of the patients, and it would become a very big question whether the "Plenum" system should not be taken out of those buildings and something of a different nature put in. It was said of the "Plenum" system that it was equally available in summer for forcing in cool air. That, he thought, was a great mistake. People did not mind having air forced into a room so long as that air was very warm, but when they began to force in cold air the inevitable result would be that the occupants of the room would block up the large openings.

Mr. R. PHENÉ SPIERS [*F.*], F.S.A., seconded the vote of thanks. He had built two of the first Board schools, and he could see now that they were in many points wrong, but they were built according to the policy of the Board at that time. What struck him most in the Paper was the admirable way in which Mr. Bailey had marshalled his facts. They could not have had a more valuable lesson in the way of bringing information before them than that afforded by his Paper. It was a record, one might say, of a lifetime's experience, and had been placed before them in such a clear and distinct manner that it would be one of the most valuable records to be found in the Institute Transactions.

Mr. BAILEY, in responding, said he was glad his Paper was considered a useful one. He had tried to make it as comprehensive as he could, as he thought it right that the Institute should be acquainted with the details of the extensive work the School Board were carrying out.

The PRESIDENT said that he could not let Mr. Bailey's most interesting and practical Paper pass without making a few comments. The great thing that England was noted for—at least till recently—was the want of any kind of artistic refinement in her industrial products. It might be safely said that if children were put into rough, unattractive, or ugly places, they could not be expected to gain that admiration for beauty of form and colour which was necessary to human happiness; nor could the children of towns, brought up among the purely utilitarian aspects of their school-rooms, be expected to produce artistic articles for savages and other artistic people—and this led to a diminution of trade. He was of opinion that the internal walls of the schools should be covered with the most beautiful tiles or enamelled bricks that the best art of England could supply, and that every fitting should be as simple as possible, but graceful and beautiful in colour, so that the faculties of the pupils might be cultivated to admire the beauties of nature which they saw around them. He had had some small experience in that kind of thing, and he found that even those students who were specially devoted to form and colour had remarkably small observation for the objects of nature by which they were surrounded in the fields, in their gardens, and on the sea-shore—the simple flowers, the simple leaves, the simple shells. If that was the case with people who were trained to study the beautiful, how much more was it with those whose artistic faculties were left dormant, and who were surrounded with ugliness! He hoped the gentlemen more particularly interested in the work of the Board would give a thought to the subject he had mentioned.

Mr. W. H. Winch, B.A., Inspector of Schools under the London School Board, writing to express his regret at being unable to attend the Meeting, said: "In some of the newer schools in my district there is a swing-door, whose oscillations and clickings with every current of air are distracting both to pupils and teacher. There is a further objection to the construction of the flooring which allows even ordinary movements to be distinctly heard in the department below."

9, Conduit Street, London, W., *3rd June* 1899.

CHRONICLE.

Employers' Liability: Workmen's Compensation Act 1897.—Counsel's Opinion.

The Council having, on the recommendation of the Practice Committee, submitted, through the solicitors to the Institute, a series of questions to counsel for opinion thereon, the following letter has been received from Messrs. Markby, Stewart, & Co.:—

57 Coleman Street, E.C.: 10th April 1899.

Dear Sir,—The enclosed document contains the Questions arising under the Workmen's Compensation Act which were submitted to Counsel (Mr. J. Walton, Q.C., and Mr. Walter Clode) on behalf of the Institute, and the Replies of Counsel thereto.

We shall be glad to know if there is any point which in the opinion of the Practice Committee requires any further elucidation.

In explanation of the answer to Question 7 we may say that Mr. Clode informs us verbally that he and Mr. Walton consider that the Court will determine for itself in the case of each particular building from what point the thirty feet are to be measured. When the point has been determined, then, if any part of the building in question is thirty feet above that point, the Act will apply.

Yours faithfully,

W. J. Locke, Esq. Markby, Stewart, & Co.

The Questions submitted to Counsel, and the Replies thereto, are as follows:—

1. Are the Employers of Architects liable under the Act for injury happening to Architects in the course of their employment?

> *We are of opinion that the proviso contained in Sec.* 1 (2) (*a*) *of the Workmen's Compensation Act,* 1897, *appears to limit an employer's liability for compensation to cases in which a workman is employed for wages, and thereby to exclude architects, who are seldom, if ever, so employed.*

2. Are Architects "Undertakers," and liable under the Act for injury happening to their Assistants and pupils during and because of their

employment? Are these two latter included under the definition of "Workman"? If so, does the liability extend to their journeys to and from the office in ordinary course, or only to journeys from the office to works or other places to which they may be sent during business hours and on the Architect's business?

> *We are of opinion that architects, whether in the employment of a building owner or a contractor who undertakes construction, repair, or demolition, are not themselves undertakers as defined by the Act, and consequently are not liable under the Act for injuries arising to their assistants or pupils during and because of their employment.*

3. Is the Architect liable for accidents to those in his employ caused by—

(*a*) Defective scaffold boards, short ladders, or other improper materials or plant used on a building by the builder who is carrying out the work?

(*b*) A fall between naked joists through a "trap" on a scaffold, overbalancing, or fall through giddiness, or a fall through a well-hole or skylight or other open space?

N.B.—A "trap" is a loose scaffold-board with overhanging end which will tip if that end be stepped on.

(*c*) Defective roofs, stairs, floors, &c., in *old* buildings which are being surveyed or measured, or falls on these through over-reaching or insecure foothold?

> *We are of opinion that architects, not being undertakers as defined by the Act, are not in any case liable under the Act, and therefore not under the particular circumstances mentioned in paragraphs (a), (b), and (c) of this question.*

4. The Clerk of Works is the Architect's representative on the Works. He is generally selected by the Architect, but paid by the latter's employer. Who is responsible under the Act for injury happening to the Clerk of Works?

> *We are of opinion that a Clerk of the Works in the employment of an undertaker as defined by the Act would be entitled to the benefit of the Act; but a Clerk of the Works employed and paid under the circumstances mentioned in this question, and described as generally prevailing, would not be in the employment of an undertaker as defined by the Act.*

5. Is a measuring surveyor a "Workman" under the Act; and if so, in the event of an accident happening to him during the making of his measurements on a building, against whom could he recover damages under each of the following heads?

(*a*) If employed and paid directly by the Employer.

(*b*) If employed by the Architect but paid by the employer (see note below).

(*c*) If employed and paid by the builder solely.

N.B.—The measuring or quantity surveyor is almost always paid by the employer through the builder, his fees being included in the contract and builder's account.

> (*a*) *We are of opinion that a measuring surveyor employed and paid directly by the building owner (employer), who is not himself undertaking construction, repair, or demolition, is not in the employment of an undertaker, and therefore not in any employment to which the Act relates.*
>
> (*b*) *That a measuring surveyor employed by the Architect, but paid by the building owner (employer), who is not himself undertaking construction, repair, or demolition, is not in the employment of an undertaker, and therefore not in any employment to which the Act relates.*
>
> (*c*) *That a measuring surveyor who is employed and paid by a builder or by a building owner who is himself undertaking construction, repair, or demolition is in the service of an undertaker, and therefore in an employment to which the Act relates; but, inasmuch as he appears to be remunerated by fees and not by wages, he appears, in accordance with our answer to the first question, not to be a "workman" within the Act.*

6. Is the Employer liable under the Act for compensation to Workmen employed by the builder should the builder or "undertaker" become bankrupt or otherwise unable to pay any sums due under the Act?

> *We are of opinion that a building owner (employer) is not liable for compensation to workmen employed by the builder with whom he has contracted to undertake construction, repair, or demolition, should such builder become bankrupt or otherwise unable to pay any sums due under the Act.*

7. From what point is the height of thirty feet specified in Section 7 of the Act to be measured—Ground level, Basement, or Cellar level? or in the case of a much sloping site, at the top or bottom of the slope, or at the point where the accident happened? In a building of varying heights at what part is the thirty feet to be measured?

> *We are of opinion that no one rule can be laid down with reference to the datum from which the measurement of the thirty feet specified in Section 7 of the Act must in the case of all buildings, whether under-*

> *ground or overground, or partly one and partly the other, be made, but we are inclined to think that if any part of a building, measured from the appropriate datum, is thirty feet in height the Act will apply.*

The Opinion will be published as an Institute paper, price 3*d*.

The Science and Art Department Certificates and the Institute Examinations.

On the recommendation of the Board of Examiners the Council have approved the Report of a Committee of the Institute appointed to consider certain proposals brought forward by the Association of Technical Institutions, and accordingly the following scheme of exemptions will hold good henceforward:—

Preliminary Examination.

(*a*) A First-class Certificate in the two Science and Art Department Examinations, Subject VI., Theoretical Mechanics, (A) Division I., Solids, and (B) Division II., Fluids, Elementary Stage, will be accepted as exempting from Division VII. (Elementary Mechanics and Physics) in the Institute Examination.

(*b*) A First-class Certificate in *both* the Science and Art Department Examinations, Geometrical Drawing (Subject I. *a*) *and* Perspective (Subject I. *c*), Elementary Stage, will be accepted as exempting from the Alternative Division VI. (Geometrical Drawing *or* Perspective) in the Institute Examination.

(*c*) A First-class Certificate in the Science and Art Department Examination, Outline Drawing of Ornament from the Cast (Subject 3 *b*), Advanced Stage, will be accepted as exempting from Division VIII. (Freehand Drawing from the Round) in the Institute Examination.

Intermediate Examination.

A First-class Certificate in the Elementary Stage of the Science and Art Department Examination in Subject I. (Practical Plane and Solid Geometry), together with two sheets of studies illustrating the intersection of solids, will be accepted as exempting from Division VI. (Descriptive Geometry: the Projection of Solids) in the Institute Examination.

Secret Commissions.

Several members have sent to the Secretary of the Institute circulars from "The Artistic Monumental Company," on some of which are printed slips, "Discount on orders from architects exceeding £12 in value, 15 per cent.; under £12, 10 per cent.," and on others, "Trade discount to architects, builders, and masons: exceeding £10, 15 per cent.; not exceeding £10, 10 per cent." An influential member of the Institute also forwards a letter he has received from Messrs. de Grelle, Hondret & Co., of 130, London Wall, E.C., in which occurs the line, "The prices enclosed are subject to 10 per cent." It will be an immense satisfaction to the profession when Lord Russell's Prevention of Corruption Bill becomes law, and the makers of such offers render themselves liable to prosecution.

Dumfries Art Exhibition.

Consequent upon the creation of the new Dumfries Academy, the local School of Art are making strenuous efforts to stimulate a love of art in the district. With this end in view it has been resolved to promote an Art Exhibition in Dumfries during July and August. The exhibits will take the form of pictures and works of art by well-known artists, specimens of sculpture, designs, &c., artistic wood and metal work, including specimens submitted by artisans and amateurs; photographs, &c. The Committee appeal to the kindness and public spirit of the possessors of works of art to lend of their treasures for the brief period of the exhibition. The new Academy, with its fine hall and spacious class-rooms, is admirably fitted for such an exhibition, and, should the undertaking prove a financial success, any balance which may accrue will be applied to the purchase of examples for use in the School of Art and workshops at the Academy. The exhibition will be opened on the 14th July by Lord Balfour of Burleigh. The Secretary is Mr. James Blacklock, 151 Irish Street, Dumfries, from whom all particulars may be obtained.

The late Charles Bell [*F.*].

The somewhat sudden death of Mr. Bell, the well-known City architect, occurred on Whit-Monday at his residence, 3, Campden Hill Square, W., in the fifty-third year of his age. He took a chill when in the country, but nothing serious was expected—in fact, he had arranged to attend at the office on the day following the date of his death. Mr. Bell was born in Grantham, and was educated at the Grammar School, after which he was for a time in the office of his brother, a builder and contractor (long since deceased), and was articled to Mr. John Giles, architect, of 28, Craven Street, Strand (now Messrs. John Giles, Gough & Trollope). On the expiration of his articles he started in practice, and soon entered into competition to a greater extent than probably any other architect. He was very successful, and carried out many important works. He erected over sixty Wesleyan chapels, twenty-four Board and Sunday schools, several banks, also warehouses and market halls, and laid out three cemeteries. Among other buildings may be mentioned the Northern Polytechnic, Holloway Road, N.; Passmore Edwards Home for Children;

Kent Wesleyan College, Canterbury; and a large building to be called the South London Hall is in hand. Mr. Bell was elected an Associate of the Institute in 1870, and a Fellow in 1880, but rarely attended—indeed, he was a hard worker and had no hobby. He resided in Belsize Park until ten years ago, when he removed to Bromley, Kent (where he carried out several schools for the School Board), and at Christmas last he removed to 3, Campden Hill Square, W. He carried on business at 51, Strand, afterwards at Union Court, City, and latterly at 3, Salters' Hall Court, Cannon Street, E.C. Mr. Bell married in 1872 the only daughter of Mr. J. Gould Avery, of Hampstead, and leaves a large family. His pleasant manner and good address materially assisted his progress. I was his closest and oldest professional friend, having known him for thirty-one years, and very much regret his loss.—Henry Lovegrove [*A.*].

NOTES, QUERIES, AND REPLIES.

Architecture and Engineering.

From John Hebb [*F.*]—

The bridge carrying the South-Eastern Railway over Ludgate Hill furnishes a familiar illustration of the incapacity of the modern engineer to adapt his work to its surroundings, and of the danger of the public interfering with the design of public works. When the bridge over Ludgate Hill was first projected an outcry was raised by a band of supersensitive persons that it would interfere with the view of St. Paul's, and to silence these objectors the railway company undertook that the bridge should be of an ornamental character. The bridge by itself, if without ornament, would not have interfered prejudicially with the view up Ludgate Hill, but on the contrary would rather have improved it, the simple horizontal lines of the bridge contrasting agreeably with the vertical lines of the Church of St. Martin Ludgate and the swelling contour of the dome of St. Paul's Cathedral, and would have given a touch of modernity to the scene which would have set in relief the beauty of the older buildings. This would have been the result if the bridge had been simply a girder bridge with the ends resting upon substantial abutments; it would have been merely an unimportant accident in the landscape and would have offended no one. But when the engineer handed the bridge over to an architectural draughtsman, who added an ornamental parapet carried on ponderous cast-iron consoles, covered with heraldic devices, and further adorned the parapet of the bridge with the City coat-of-arms, the whole being painted a bright reddish brown enriched with gilding, the effect was disastrous. The eye, in spite of oneself, now rests upon the bridge with its preposterous bedizenment instead of seeking the buildings further up the hill, as it would do naturally were the eye not arrested by the fussy, tawdry, and pretentious attempt at decoration at the foot of the hill. Take away the ornament, and the bridge would merely strike one as a plain utilitarian piece of civil engineering. "There never was," says Mr. Ruskin, "more flagrant or impertinent folly than the smallest portion of ornament in anything concerned with railroads or near them. . . . Railroad architecture has or would have a dignity of its own if it were only left to its work. You would not put rings on the fingers of a smith at his anvil."

The beauty of an engineering work is in the work itself, and if that is not evident, no amount of ornament will conceal its deformity or make it beautiful. Mr. Ruskin gives some admirable advice with regard to the use of ornament in the *Seven Lamps of Architecture* (p. 109), which may be usefully quoted:—

> Hence then a general law . . . a law of simple common sense,—not to decorate things belonging to purposes of active and occupied life. Wherever you can rest, there decorate; where rest is forbidden, so is beauty. You must not mix ornament with business, any more than you may mix play. Work first, and then rest. Work first, and then gaze; but do not use golden ploughshares, nor bind ledgers in enamel. Do not thrash with sculptured flails, nor put bas-reliefs on mill-stones. What! it will be asked, are we in the habit of doing so? Even so, always and everywhere. The most familiar position of Greek mouldings is in these days on shop fronts. There is not a tradesman's sign nor shelf nor counter in all the streets of all our cities which has not upon it ornaments which were invented to adorn temples and beautify kings' palaces. There is not the smallest advantage in them where they are.

Sir George Cornewall Lewis is said to have remarked that "life would be tolerable were it not for its amusements," and in a similar vein it may be said of engineering works that they would be tolerable were it not for their ornament.

British Plasterwork.

The Annual Report of the Leicester Society, just to hand, gives an abstract of a Paper on British Plasterwork Past and Future, read before the Society by Mr. G. P. Bankart. Plasterwork, the lecturer said, was an art craft of very ancient origin. In the fifteenth century, after having apparently lapsed, it came into practice again. Lime of best quality was chopped up, beaten with stick again, and subjected to three courses of preparation, ending with an admixture of marble-dust to get the hardness and whiteness of the original stucco duro. The application of this was so far successful as to be greatly favoured by the Venetians and Mantuans, from whom the practice was handed on, *viâ* France, to England, whose monarch (Henry VIII.) imported workmen for the adornment of his house of Nonsuch, now lost to sight. The Italian art thus introduced into this country soon gave way to a coarser style of work. In the place of figure-drawing, an arrangement of panels appeared, with patterns of small area that would repeat with ease. The Fish Room at Audley End was a capital example of this Early

English school. Subsequently the size of the subdivisions expanded, until it became the habit to divide ceilings into quarters. This ultimately led to the abandonment of the strict geometrical system. In executing the type of plasterwork seen at Kellie Castle and other places, the design was drawn upon the ceiling, the stems and leaves employed being modelled *in situ*, with the details added as required. At Holyrood a company of gentlemen modellers was formed, who did much to preserve the best traditions of the art, which about the time of the Restoration acquired a new vitality. Later on, the art again declined ; texture was lost.

About this period *few* Italian designers and stucco workers came to England—the decorative plasterwork being chiefly done by English craftsmen. Wren used his influence in refining the work on French lines. William III. and the more settled state of affairs again revived the art, and the Italian influence flickered for a time, but gradually dissolved into the spirit of Louis XIV. and Louis XV. of France, in which English craftsmen became facile. Gibbs, a pupil of Wren, patronised the art by encouraging two Italians—Artari and Bagutti—whose work is shown in the churches of St. Mary-le-Strand and St. Martin's-in-the-Fields, London, and elsewhere.

Meanwhile English craftsmen worked in the French method, consisting of twisted and tangled lines of various kinds, which pleased the light glance of the French spirit, but proved offensive to the English nature.

Then came the influence of Chambers, Joseph Wilton, Thomas and Charles Clarke, Joseph Rose and his pupil Thomas Papworth, and the last survivor of the line of designers, who died in 1814. Then followed the compo work of the brothers Adam, which replaced the old work in an insignificant manner, and so on down the hill of the nineteenth century to the period of centre flowers and other stuff we are so familiar with.

The lecturer then described the charm of the old work. In the reigns of Elizabeth and James more was done by eye-and-hand judgment than by the measured exactitude of modern times born of the T-square and drawing-board. Great importance was attached to the influence of the study of nature, when the art was first introduced into England, and the limited nature of the material. Design would only come by designing, and not by drawing, designs, or any other means.

In any possible good and future state the craftsman must be allowed the freedom of his art, and by degrees co-operate with or supplant the "professional gentleman" and his paper creations, which must to a certain extent be born in ignorance of the virtues of the material. More men of refined and creative powers are required as craftsmen, men who know the difference between "design" and the intellectual poverty of imitating old styles—a mere apology for architecture.

These men must be drawn from the ranks of the profession, and encouraged to do something real, lasting and good, however simple. Scores of capable men, now working out sluggish existences as architectural "ghosts" for a mere pittance, might find constant, happy, and remunerative employment by asserting their individuality, and devoting their energy and inventive powers to the working of a craft.

The gift of selection, however, is the great difficulty with designers of decorative work. In this difficulty the designer must go to Nature for his inspirations, learn from past ages how to express them. This expression must be harmonious in arrangement, *i.e.* decorative—suitable to its purpose and position in the midst of surrounding work, expressive in the highest degree of the virtues and limitations of the material in which it is expressed, and not imitative of the textures and natural effects of other materials. As far as possible, the thought stuff should be realised, *i.e.* the work be suggestive of the place, the surroundings, and perhaps the industry associated with the neighbourhood.

The lecturer urged the younger members of the profession not to think the practising of a craft as unworthy of their attention, or even their ambition, for the practising of a craft was a grand thing, a permanent legacy, and a blessing to posterity in the beautifying of life.

MINUTES. XIV.

At a Special General Meeting, held on Monday, 29th May 1899, at 8 p.m., the President, Professor Aitchison, R.A., in the Chair, with 26 Fellows (including 10 members of the Council) and 39 Associates, the attention of members having been directed to the notice convening the Meeting, upon the motion of the President, it was

> RESOLVED, *nem. con.*, that the Regulations under By-laws 3 and 7, relating to the procedure prior to nomination of candidates for membership, be suspended temporarily, and that Mr. George Frederick Bodley, A.R.A., *Royal Gold Medallist Elect*, be forthwith admitted to candidature as Fellow, the election to take place at the Business Meeting of the 12th June.

The Special Meeting then terminated.

At the Fourteenth General Meeting (Ordinary) held on Monday, 29th May 1899, at the conclusion of the Special Meeting above minuted, the President, Professor Aitchison, R.A., in the Chair, with 26 Fellows (including 10 members of the Council), 39 Associates, and several visitors, the Minutes of the Meeting held 15th May 1899 [*ante*, p. 401] were taken as read and signed as correct.

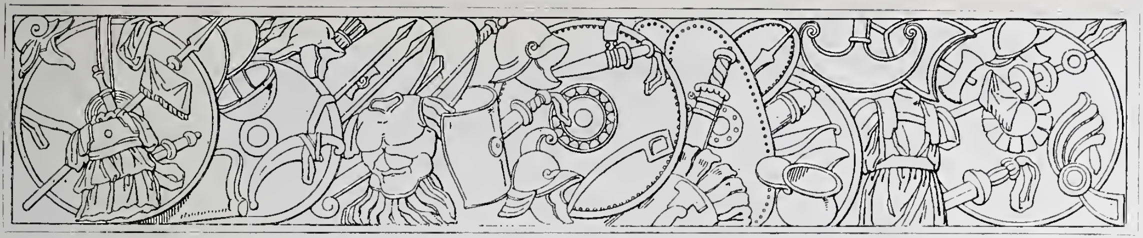
The decease was announced of Charles Bell, *Fellow*.

The following Associate, attending for the first time since his election, was formally admitted and signed the Register, viz. James Wrightson Bateson.

A letter was read from Lord Reay, Chairman of the London School Board, respecting the Paper to be read before the Institute that evening [p. 428].

A Paper by Mr. T. J. Bailey [*F.*] on THE PLANNING AND CONSTRUCTION OF BOARD SCHOOLS having been read by the author, a discussion ensued, and a vote of thanks was passed to the author by acclamation.

The proceedings then closed, and the Meeting separated at 10 p.m.



RHYTHM IN DESIGN; OR, THE ANALYSIS AND APPLICATION OF HARMONIC FORM.*

By F. Bligh Bond [*F.*].

THE power of perceiving beauty in line or contour is one that we all possess in varying degrees, and our instincts readily tell us when any form possesses the attribute of beauty. But as the faculties of which we make use in perceiving beauty are unconsciously or instinctively applied, the laws and principles which govern beauty in form do not so readily appear. Through a want of unanimity or consistency on the theoretical side of the subject, much confusion has been created, and the underlying principles have remained obscure. They have not, in fact, become matters of exact knowledge to the general world.

We are well used to the controversies and wranglings which are for ever going on in artistic circles as to the relative fitness of various orders of form in decoration; and we have seen the ideas of one school of design after another alternately prevailing, and an action and reaction of public taste taking place, leading to the adoption of successive fashions in general design, all of which to the careful observer are marked in their earlier stages by a certain leavening of inspiration, and in their decay by the grotesque exaggeration of type, and the loss of that sense of proportion which should control and restrain the leading motive now carried to excess. Such fashions have been manifold, as the leading principles of form can blend in infinite variety, and produce many distinct parent types to form the backbone of styles; but, speaking broadly, we may say that all forms and styles group themselves under two well-contrasted heads—the Curvilinear and the Rectilinear. The Curvilinear represents dynamic force, vitality, and movement; the Rectilinear symbolises static conditions, rest, and stillness.

It must be conceded that both these original types of form contain elements necessary to good design; yet both, as I hope to show, are, if used singly, unfertile in those rhythmic or harmonic qualities which alone are truly satisfying to the artistic sense, and are therefore only capable of yielding temporary pleasure as a reaction from a surfeit of the opposite fashion. I shall endeavour to show, on the one hand, that no absolutely rectilinear arrangement can possibly find place in a truly harmonic system of design; and to make clear, on the other hand, the reasons why no such aggregation of extreme curvilinear forms as the later Renaissance yielded in the hands of some of its exponents can ever hope to satisfy. The theory which I will presently advance of the true nature of harmony and abstract beauty in form is one which, though based upon the intermingling of rectilinear with curvilinear forms, and thus, in effect, retaining the best decorative qualities of both systems, yet in strict theory renounces the former in its absolute development or extreme type.

It will be necessary to the full illustration of my subject that I should draw some parallels between harmony in its optical aspect, or rhythm in form, and its counterpart in music: though I must first briefly remind you of the difficulty always confronting us in any attempt to draw such a parallel—namely, that in the case of musical effects the perception of an harmonic progression is a sequence in time, whereas the kindred perception of form-harmonies is an instantaneous or simultaneous apprehension of many such progressions. Yet the analogy is far from fanciful; indeed, as I hope to show, it is a very real and vital one.

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* The substance of this essay was comprised in a Paper read before the Bristol Society of Architects in January 1899; but it has since been to a great extent re-written.

Essentially the difference lies in the fact that our perception of harmony in form has reached a higher plane than that on which we enjoy the harmony of sound. It is said, however, of some highly gifted musicians, and is, I believe, quite true of some of the great composers, that they could apprehend a sequence of musical harmonies as a simultaneous presentment—a sort of musical picture—and that the whole length of some grand symphony might, in moments of inspiration, be equally present with them, the sense of time being lost or transcended. This must be a grand experience; but the necessity of interpreting piecemeal their beautiful conceptions, and the rendering of them note by note as a sequence, in order to record them, must seem almost a degradation. But if the great majority of us have not this wonderful power of contemplating the finished result of a long sequence of ear-harmonies, let us at least try to realise that we have in our sense of visible beauty a power of precisely analogous description, based upon the same principles, and equally capable, under proper culture, of yielding us the most profound delight. The eye builds up line by line, as the ear builds note by note, a form, a phrase, a melody. The ear reaps its satisfaction by going over its favourite sequence of notes, in a steadily-timed progression, catching the general purport of the melody in a more or less partial and fugitive manner, and so little continent of the organism of the melody that it can carry but a small part at a time. The eye, however, having traversed the harmonic line built under its guidance, can pause to grasp the whole, and with deep satisfaction absorb the general idea which all the mutually interdependent parts combine to present. So complete is the idea of the *total* of a visible harmony that the progressive stages are lost, and with them vanishes the idea that what we are looking at and contemplating as a beautiful outline is in reality the sum-total of a series of progressions or movements, acting and reacting on one another until the figure is completed.

Further on I shall enter more fully into the connection between form and motion, and demonstrate the truth of the proposition that a line or curve is the formal representation of a movement or energy in a given direction. Before proceeding to this, however, I wish to draw a clear distinction between beauty of form in the abstract (which is the subject of my present remarks) and beauty of expression in the more definite and concrete form. In the one case, as in a simple arrangement of curves, no definite idea or meaning is conveyed, whilst in the other (as in statuary or symbolic carving) some tangible idea is worked out, having some human interest or relationship, and capable of verbal elucidation or exact description. This double nature, these two elements of beauty, co-exist in all works of art. There is the inner soul or aim of the work, which is the poetry of the thing, and there is the rhythmic garb or dressing, which, if skilfully woven, can so powerfully appeal to the emotional or sensuous part of the perceptions, as to throw a subtle glamour over the whole, and lift the beholder to a better understanding of the central idea conveyed.

The old prejudice which clothes poetic thoughts with rhythmic verse has its roots deep in our complex nature, and we cannot violently dissociate the two. It is the same thing with vocal or descriptive music, where the vague feelings stirred by the melody or rhythm serve to enhance and to give reality to the romance interwoven with the music. Reverting, then, to design, I hope my meaning has been made clear, that harmony or rhythm in design must be expressly dissociated from the poetry of architecture, and, in considering it, it is necessary to dismiss from one's mind any reference to formal representations of human or animal life, save perhaps of outlines of the broadest conventional order, possessing no individuality.

I will now enter properly on my theme, starting with this definite and all-important contention as the groundwork of the whole—namely, that there exists in the human mind a power of perceiving harmonic ratio in line, and interpreting it as beauty, precisely as it interprets the effects of harmonic vibrations in sound (as music) and in rhythmic motions; and that it is this power which, consciously or otherwise, lies at the root of all our perceptions of abstract beauty in line and form, and of the sensations of pleasure which may be derived from contemplating it. The existence of such a power may be doubted by some, and no doubt the suggestion may be repugnant to many others, who would prefer to believe that no mechanical laws can bind their sense of the beautiful, which they would regard as belonging to a domain higher than any exact science could carry us, and perhaps an endeavour to lay down such rules would seem to them almost like sacrilege—a degradation of ideal things to a commonplace or materialistic level. The reality, to my view, would be the very contrary, and if, by any effort of mine, I could lift this subject ever so little out of the hazy and chaotic condition it is in at present, and show, beyond all possibility of disproof, that the same fixed and immutable principles underlie our perception of harmony or rhythm in form as in music, I should feel I had helped to lay the foundation for a future appreciation and enjoyment of rhythm in design of a conscious, intelligent, and reasonable character.

I wish to emphasise, by a further allusion to music, my answer to those whose sense of the ideal freedom of artistic design would take alarm at the idea of any mechanical or fixed law obtruding itself into their Elysium. I would ask them to consider whether, if such a law be demonstrated, it need after all involve any restriction or degradation of their ideal freedom of design. Would it not rather furnish them with an intelligible and secure basis on which to raise their work, and give them a test of the correctness of their instincts in interpreting beauty in form? Has the art of music suffered at all from the discovery or application of the physical laws on which musical harmony is founded? Certainly not. The best composers distinctly owe their success in finding expression for their ideas, and thus in producing lasting work, to that ability to translate and interpret the dreams of their genius which is given them by a sound education in the grammar and machinery of harmony.

There have been many schools of musicians, and their respective teachings have no doubt varied within wide limits, but I venture to assert that they would all be in agreement on the necessity of a complete grasp of musical theory, harmony, thorough-bass, and counterpoint, and also a knowledge of the physical side of music, of the relationship and nature of different vibrations, before a pupil could expect to become a master, or venture to launch his compositions before a critical musical world.

Why have we no such grammar, no such system of harmony in design, when the perception of harmony in form and discord in form is equally with us, and equally intense in some of us, and, as I verily believe, only awaits systematic education to emerge from the unconscious to the conscious stage? Surely this is a matter for surprise.

There is a broad and marvellous field of delicate and subtle perceptions lying open to us, inviting our investigation, offering rewards of great delight, and how many among us have eyes to see what is there? I fear many of us are gazing into it through the medium of empirical ideas and the distorted views of quack designers. We hear, and heed too much, the sentimental vapourings of artists and art critics, and of all those who, having approached the subject of design from its emotional or poetic side, have discerned no system, or at best only the scattered fragments of one. Are such to be our guides towards a rational understanding of harmony in form? Is this chaos to last?

Multitudes of books are written on the subject of beauty in design, but, so far as my experience goes, they generally lead one into a maze of bewilderment, and are very disappointing.

People make frantic efforts to express in terms the emotional value of certain works, and get terribly involved through their inability to dissociate those elements which are capable of verbal expression from those which, like the emotional value of rhythm in form, sound, or motion, lie beyond the province of words altogether. Tedious platitudes, cant phraseology, sentimental gush, flabby and invertebrate theory—these are some of the results of trying to convey in words the æsthetic value of these natural harmonies, and to infuse into them higher meanings which they do not in themselves possess—though they are the invaluable handmaids of the higher and more intellectual conceptions. They are not poetry, but are the almost indispensable adjunct to poetry. They are music, and underlying them is a science whose laws may be expressed in correct terms, and interpreted to students in the English language, without mystery or obscurity. If the artist or architect could but learn a coherent system of music in form how vastly would he, and the public for whom he caters, be the gainers, by the increased certainty and lucidity of his work, and the strength and delicacy of his interpretations, and he personally, in the power and delight which his knowledge would then afford him of creating things of beauty.

I have stated that I consider the perception of harmonic ratio in form to be a power latent in us all, though undeveloped, and I think the truth of the proposition can be easily established by reference to some of the simpler harmonic forms, in which the instinctive recognition of harmonic quality and mathematical correctness is developed in most of us to a great degree of refinement, so much so that we are able to recognise the very slightest visible deviations from the perfect form. I refer to the circle and the ellipse. What is true of these simple forms is equally true of the more complex, because these are of essentially the same nature, and we can easily educate our perceptions to be sensible of an error in a complex curve, by care and attention. The power is capable of development to any extent, and only needs systematic cultivation, whilst its increasing refinement and delicacy of operation yields a proportionate degree of pleasure and satisfaction, undreamed of by those who have not studied the subject. We ought in the future to be the possessors of a large number of new perceptions of great delicacy and exactness, and to feel and be stirred by music in form as we now feel it in sound. We ought to be able to discern and reject at a glance, as discord, any deviation from harmonic laws or incongruous or unsuitable juxtaposition of different orders of form, just as in music we not only take care to observe the laws of harmony, but also take pains that in the orchestration of a piece, the "timbre" of the sound given by the different instruments is properly apportioned and blended, and also that the performance is not marred by the introduction of incongruous movements, such as would present a contradiction in mood or feeling.

Our sense of harmonic correctness in line will, I believe, become capable, after education, of being applied with so great an exactness that almost a hair's breadth deviation will appear to us as an unsightly crippling of the perfect form.* The truth of this proposition may be made familiar by some means of systematic experiment, such as are offered us by the various kinds of harmonographs for the transcribing of musical or acoustic curves, or the resultants of compound pendulum vibrations. These most interesting and instructive little machines are not nearly so well known as they deserve to be, but with their aid I have sought, and have found, a perfect correspondence between mathematical correctness and æsthetic value, in all the forms which have come under my notice; and having tested the effects of some thousands of these lines upon my own perceptions, I have fully satisfied myself not only that in our recognitions of abstract beauty we are fully under the dominion of those permanent mathematical principles of ratio which rule in the physical domain, but that these principles, in their application, might be to a large extent classified and formulated for the use of the designer, and a grammar of harmony constructed.

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* I am informed by a friend who has considerable knowledge of India, and experience of native workmen, that the trained castes of designers who produce that truly harmonic and mathematically perfect work in inlaid marble or wood, which delights the whole artistic world, are not in the habit of using any mechanical or mathematical appliances for the working out of their rich designs, but prefer to trust to the safe guidance of their marvellously developed instinct.

The most lamentable result of the want of training of the harmonic sense is that we are by no means so sensitive as we should be about the employment of crude and makeshift forms, and our natural delicacy of perception has been blunted by the adherence to false rules and unworthy models, whose sole merit has, in many cases, been their antiquity.

What perceptions of form Nature has educated us into by inviting us to observe the growth of herb or limb, we have to a great extent corrupted by the blending of natural or harmonic forms with those of a geometrical or hard mechanical sort, in ways utterly unnatural and utterly preposterous, until now many of us do not know a good line from a bad one. There is, of course, speaking of geometrical forms, always an exception to be made where architects are concerned, for building conveniences demand a certain squareness and angularity of outline; but I contend that a skilful architect, knowing his grammar of harmony, would never be mastered by such conveniences, but, whilst duly respecting them as necessary conditions, would always, in his designs, rise superior to them, and make them subservient to his harmonic scheme, when they would be traceable only as basic forms, lending stability and repose, but whose nakedness is draped by the skilful hand of the designer, so that their severity is lost, whilst their vigour is retained.

I have now reached a point at which I must try to clearly define rhythm. I will try to formulate (1) its nature, (2) its application to design.

(1) Rhythm is the effect of natural motion or motions having periods bearing a definite ratio to one another, acting in a given direction, and combining to form an harmonic sequence or series of movements.

(2) Rhythm in design is the art of registering and applying or adapting the forms created by the interaction of these natural motions in their various phases; the sequence of their relationship being thus tabulated as a *curve*, so that the eye may simultaneously grasp and understand the whole period of the movement, such curves forming the basis upon which a complex design may be built up.

From the foregoing we deduce the following:—

(*a*) Every line is a progression, and should be viewed as such in order to be truly understood.

(*b*) Every true line, except the absolutely straight line, is an harmonic progression, and pictures the operation of a force or forces. In its dynamic nature lies its vitality, and its artistic character is directly dependent upon its correct representation of force.

I will also add:—

(*c*) Every complex line or curve possessing the above nature has the attribute of beauty, the eye perceiving the consistency of the law governing it.

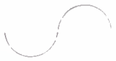
(*d*) The arbitrary juxtaposition of curves following different laws, or not containing the same harmonic elements, is inferior in beauty and in force or vitality, the eye detecting as discord the divergence in principle.

I could illustrate by abundant examples both these latter rules which I have postulated. But a few considerations, by way of illustration, are all that will be necessary for the present, and I think both principles will be found easy of application if a little study be given to them. Let me ask you to make a collection of all kinds of harmonic curves, and study them intelligently, tracing the direction of the forces of which they are the resultants, and you will soon begin to acquire what I may style the "dynamic sense," which is really a more intelligent development of the "harmonic sense," by which we instinctively perceive beauty. The application of these to design will become easier and more certain. Especially in designing wrought-iron scroll-work will the process be found beneficial.

But before studying complex curves, there is much to be learned from the careful consideration of the simplest harmonic forms: the circle, ellipse, spiral, and parabola. Of any of these, we seem to be licensed, by our intuitive sense of what is proper, to take parts only for use in architectural and general design, or, if desired, to put two similar segments of the same curve in opposition, as in pointed arches, foiled circles, ogees, &c. What we are *not* entitled to do is to produce a mongrel curve, simulating a complex harmonic curve, by joining together, end to end, portions of simple or circular curves. This is an important rule, generally disobeyed, especially in late Gothic or Renaissance designs. The instinct of designers would seem to have been sadly blunted, or to have gone much astray, when they could be satisfied with such mongrel or crippled curves as these very generally are.

Let my rule be applied, for instance, to that most hideous of curves, the so-called "three-centred ellipse." This curve is without consistency, following no uniform law, and therefore destitute of dynamic vigour. Its effect on the really sensitive eye is quite painful, yet it passes muster frequently among latter-day architects.

In respect of the more subtle and sophisticated "five-centred ellipse," most of us have not our harmonic sense sufficiently attuned to feel its harshness. In the same bad category I must place the Tudor four-centred arch, and all those ogees which are compounded of circular curves of varying radius.

Neither is the combination of two segments of the same circle in contrary flexure a satisfactory one . It is far from being so pleasing as Hogarth's line of beauty, which follows a uniform harmonic law from end to end—that is, it represents the whole period of a certain complex vibration.

Not to unduly multiply instances, I will content myself with mentioning one of the worst transgressions of all—namely, the junction of the circle and the straight line. Frequently one sees what is called a flat arch—that is, having horizontal voussoirs, and to this is given rounded corners. The form may have conveniences, as all straight lines are convenient—too convenient, alas!—for builders, but where is the excuse? A very slight alteration would restore to the line an harmonic quality. The Burgundian architect effected this by the very appropriate use of a counter curve in the centre, almost annulling the straightness of the remnant of the line.

I must now revert to the basic or geometrical forms, which are founded on the straight line. Architects can never ignore these. It is impossible, and it is not desirable, that we should get quite away from them. Architectural construction, which is dependent on equilibrium, can never violate the laws of stability in the mass, and therefore squares, levels, and perpendiculars will form the framework of building for all time. But if architectural with general design is to be regarded as the expression of living forces, as may be inferred from the rules I have laid down, then it becomes a question how we are to confront and deal with those basic elements of straightness and rigidity which are in themselves dead, and devoid of rhythmic energy, and are, as one might say, the skeleton within the living flesh.

Straight lines in their absolute nakedness are expressive only of passive stillness and monotony. An ornamental arrangement of straight lines only can never satisfy, though under certain conditions it may please, but you will most assuredly find that the pleasure to be derived from straight lines is not a positive pleasure at all, but at best an agreeable feeling of reaction experienced by way of contrast after the eye has had an overdose of luxuriant curvature. The use of the dead square line should, I think, be reserved by future designers for tombs, mausolea, and such-like temples of death, as an emblem of eternal stillness and inflexible destiny.

Nature gives us no argument for the use of the absolute straight line, as no natural line is really straight, but, from some point of view or other, will be found to possess subtle curves. Her lowest order of forms—the crystalline—produced by the action of simple molecular forces, is constructed, it is true, upon a geometrical basis; but they all present, in the natural state, certain irregularities of outline, which redeem them in the mass from absolute monotony.

In the vegetable kingdom the rhythmic expression of the living forces of growth and expansion comes into fuller play, and the characteristic outlines indicative of the vital forces peculiar to each herb become more complex and beautiful as we ascend the scale of evolution. In the infinitely varied outlines of growing things we detect a harmonious working out of two forces—the alternation of *development* and *restraint*, or the lines of interaction between energies of opposite tendency, giving us a variety which can never stale.

All these forces, together with the pendent curves produced by gravity, and the perception of continuity of structure, are translated by the inner perceptive faculty as harmony, and conveyed to the inner sense as beauty.

Reverting for a while to what I said concerning the use of square lines in design, and the inharmonious result of a mere mixture of straight lines with curved ones, I cannot of course be supposed for a moment to advocate a wholesale departure from straight lines in design, nor do I. But there are two ways of using them, having markedly different optical results. If used unskilfully in, let us say, an architectural design, the straight line will assert itself among countless other features very clearly, and its native harshness will not be disguised; and why?—because it is not combined or interwoven with lines of other tendency, so as to suggest to the eye any more harmonious line formed by the sum total of all the features. It is all the difference between a mechanical mixture of two different elements, and their chemical combination. But it is possible, and easy enough if proper care be given, so to regulate your smaller features in a design that they may form a series of points upon a general "line of suggestion," the effect of which upon the eye will be sufficiently obvious to withdraw attention from the rectilinear backbone, and the severity will disappear. The minor features yielding the chosen "line of suggestion" must be of sufficient size and frequency to form a well-marked series, but they need not *in themselves* take any particular shapes so long as they are of the right projection. Their individual shape does not count in the total effect, except in a secondary manner. In one direction only, the horizontal, does the unadulterated straight line appear to be correct and satisfying, and the reason for this appears to be that the straight line is expressive of constant or uniform motion, which is a kind of motion only natural in a horizontal direction.

Vertically all propulsions of force are subject to the laws of gravity, causing progressive retardation in rising, and acceleration in falling, yielding more or less parabolic figures, and I feel quite clear that, unconscious though we may be of the existence and requirements of our "dynamic sense," it is always urging us most strongly to obey these laws in design.

I feel I ought to make one exception, in favour of the use of the vertical straight line in a limited manner, and that would be when it is used in the formation of a pendent. In such a feature my rules would permit of its use, as it there symbolises a constant force acting vertically downwards.

I now wish to speak briefly on the subject of the simplest and most elementary of harmonic lines—the circle. This beautiful figure expresses either of two sorts of motion, and can be built up from each. It is formed:

(1) By the motion of a point at a uniform distance about a centre.

(2) By two rectilinear motions of equal period and extent, acting upon the same point at right angles to one another, and alternating in time.

The circle, or sphere, is the simplest of natural forms, and very close and perfect approximations to it are found in organic nature. But though it is the parent of all other graceful forms, it is not fitted for indiscriminate use in design, on account of two characteristics:

(1) In general design, because of its monotony.

(2) In architecture, because it is not a form subject to the laws of stable equilibrium.

The latter objection applies, of course, only to spherical or circular *masses*, not to circular spaces, as these, having no weight, cannot offend the law of equilibrium.

Parts of circles, or parts of spheres, are, however, a matter of everyday use and convenience, and, were it not for their extreme and sometimes painful monotony, might be considered the most essentially useful element in architectural design. The ease with which purely circular forms may be struck, as distinguished from the more complex harmonic sweeps and curves, tends to make them permanently popular, and long custom has rendered them traditionally correct.

We have next to consider the elliptical form, which is directly derived from the circle, as the circle yields the ellipse when viewed in perspective. Here we have a really rhythmic form, and the trained eye traces with interest, as well as with delight, the interaction of the two forces which produce it: the vertical, which is retarded or lessened by insensible gradations as the crown of the curve is reached; and the lateral, which is correspondingly accelerated or increased. Every part of a true ellipse is musical in form, just as its counterfeit (of compound circular origin) is harsh and discordant.

It is a wholesome sign of the progress of refined sensibility amongst modern architects, that they are beginning more generally to appreciate the beauty of true elliptical forms, and to make use of them.

In the same category as the ellipse I will place the parabola, which is of kindred nature, though an open curve, and is one which may be used in its entirety in architectural work (as, *e.g.*, in forming a "line of suggestion" for the general skyline or contour of a group of buildings, or large building with numerous salient features) in entire accordance with the laws of stability and equilibrium.

The parabola is the product of various combinations of natural forces, but for our purposes may be regarded as the resultant of two simple vibratory motions—the horizontal one having exactly twice the period of the vertical one It is a curve which is most delightful to the eye, and thoroughly well fitted for application to architectural design, especially in roofs and skylines.*

From the parabola, it is an easy step to the more complex harmonic lines which are the resultants of two or more forces of other ratios than 2 : 1 acting upon one another at right angles, and with varying amplitude. In some of these now in my possession, executed by the mechanical means already suggested, or by the simple mathematical process of plotting the curves on squared paper, the effect is almost magically beautiful—the most characteristic being those in which, upon the basic form of the ellipse, parabola, or lemniscate, there are grafted subtle variations produced by the presence of higher harmonics in a subordinate degree—precisely analogous to those strictly subordinated harmonics which in musical instruments yield such varying "timbre" with the same basal note, and which give to the different instruments diverse tones—hard, soft, liquid, mellow, metallic or brazen, full, thin, rich, reedy, &c. All these have their counterparts, more or less recognisable, in the character of lines. It is a fact well known to science that each of these qualities in a musical instrument is the direct result of a particular selection of certain harmonics in certain degrees of strength, accompanying the fundamental note; and so far-reaching is the law that it controls even the formation of vowels and consonants, which have all been successfully imitated by the incorporation of their proper harmonics.

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* The chief source of that extreme sense of refinement conveyed by Oriental architecture is the general use of parabolic or cycloidal curves in preference to circular ones.

In the same way, by skilfully blending and applying the harmonic principle to lines, we can give them an expression of force or feebleness, richness, wiriness, rigidity, flexibility, grace, sternness, and what not; but to be able to do this with certainty and clearness of expression, we should have a conscious knowledge of the laws which we are calling into operation.

Having indicated that the character and artistic value of a line is the outcome of harmonic elements properly selected and applied, I now come to speak of what we call "conventional" design or ornament.

Conventional representations of any well-known class of forms is *merely the arbitrary choice of those harmonic principles in a form which gives it its distinctive character*, or "timbre," or, if I may so term it, "flavour." In all natural forms there are essential characteristics which are the result of the working of special harmonic principles, besides a great many variations of a more intricate kind which are the outcome of accident or circumstance. It is the business of the conventional designer to select the one, and to discard the other; and this sorting or weeding-out of the essential from the non-essential preserves, as it were, the soul of the form, whilst rejecting its material part.

Conventional representation (like time, tune, and orchestration in music) is therefore an orderly classification which conveys to the æsthetic sense a clear, select, and definite impression easily understood at a glance. If then, as we have seen, our appreciation of the simpler harmonic forms as found in the vegetable world depends to a very large extent upon our conception of the growth, movement, and special vital characteristics of the different orders of plants, then, in a similar way, our appreciation of beauty in the higher forms of man and animals depends upon our knowledge of, and our ability to understand, the various powers and capacities of movement which the position and sizes of the muscles, or the proportions of limbs and trunk, denote. But with animal and human types, architectural art has little or nothing to do in its structural portions, as it is an art expressive of fixity in position, whilst these forms are entirely expressive of, and characteristic of, locomotion. There are, therefore, very few instances in which the incorporation of the human form as an architectural feature can be regarded as even a qualified success. Those great sitting giants forming the façade of the rock temple of Abu Simbel in Egypt are, to my mind, about the most legitimate, or least unsuitable, instances of its application. From their stupendous size and massive breadth of treatment, as also from their resting posture, they have a certain appropriateness inspiring a sense of repose, stability, and permanence, and thus seem to satisfy that sense in us which looks beyond the material or concrete expression, and, as I have endeavoured to show, sees in the humblest line a symbol of those eternal vitalities which throb ceaselessly throughout the visible world, and whose music is intuitively felt by us, although we have not yet arrived at the full and conscious recognition of it in all its manifold presentments.

9, Conduit Street, London, W., 17*th June* 1899.

CHRONICLE.

THE ANNUAL ELECTIONS.

The Council.

At the Meeting of Monday the 12th inst., the Council for the year of office 1899–1900 were declared duly elected as follows :—

President.—William Emerson.

Vice-Presidents.—John McKean Brydon; William Milner Fawcett, M.A.Cantab., F.S.A.; Henry Louis Florence; Edward Augustus Gruning.

Hon. Secretary.—Alexander Graham, F.S.A.

Members of Council.—Frank Thomas Baggallay; Thomas Blashill; James Brooks; John James Burnet, A.R.S.A. (Glasgow); William Douglas Caröe, M.A. Cantab., F.S.A.; Thomas Edward Collcutt; John Alfred Gotch, F.S.A. (Kettering); Edwin Thomas Hall; Henry Thomas Hare; Edward William Mountford; Beresford Pite; John Slater, B.A. Lond.; Richard Phené Spiers, F.S.A.; Henry Heathcote Statham; Leonard Stokes; Sir John Taylor, K.C.B.; Paul Waterhouse, M.A. Oxon.; Aston Webb, A.R.A., F.S.A.

Associate-Members of Council. — James Sivewright Gibson; Henry Vaughan Lanchester.

Representatives of Allied Societies.—David Barclay (Glasgow Institute of Architects); Robert Isaac Bennett (Manchester Society of Architects); James Crocker (Devon and Exeter Architectural Society); Thomas Drew, R.H.A. (Royal Institute of the Architects of Ireland); Robert Evans (Nottingham Architectural Society); Charles Busteed Fowler (Cardiff, South Wales, and Monmouthshire Architects' Society); William Glover (Northern Architectural Association); Albert Edwin Sawday (Leicester and Leicestershire Society of Architects); Joseph Smith (Sheffield Society of Architects).

Representative of the Architectural Association (London).—George Halford Fellowes Prynne.

The Standing Committees.

At the same Meeting the following members were declared duly elected to serve on the Standing Committees for the ensuing year of office :—

ART STANDING COMMITTEE.

Fellows.—John Macvicar Anderson, F.R.S.E.; James Brooks; John McKean Brydon; William Douglas Caröe, M.A., F.S.A.; Ernest George; Henry Thomas Hare; Edward William Mountford; Henry Heathcote Statham; Alfred Waterhouse, R.A., LL.D.; William Young.

Associates.—Robert Shekleton Balfour; James Sivewright Gibson; Henry Vaughan Lanchester; Andrew Noble Prentice; William Henry Romaine-Walker; John William Simpson.

LITERATURE STANDING COMMITTEE.

Fellows.—John Bilson; Henry Louis Florence; Alexander Graham, F.S.A.; Benjamin Ingelow; John Tavenor Perry; William Alfred Pite; Sydney Smirke; Richard Phené Spiers, F.S.A.; Henry Heathcote Statham; Paul Waterhouse, M.A. Oxon.

Associates.—Arthur Smyth Flower, M.A. Oxon. F.S.A.; John Humphreys Jones, B.A. Lond.; Andrew Noble Prentice; Ravenscroft Elsey Smith; Leslie Waterhouse, M.A. Cantab.; Percy Scott Worthington, M.A. Oxon.

PRACTICE STANDING COMMITTEE.

Fellows.—Thomas Batterbury; Samuel Flint Clarkson; Thomas Harris; George Hubbard; Alexander Henry Kersey; Joseph Douglass Mathews; Walter Hilton Nash; Beresford Pite; James Osborne Smith; Edmund Woodthorpe, M.A. Oxon.

Associates.—William H. Atkin-Berry; Charles Henry Brodie; Herbert Hardwicke Langston; Sydney Perks; Augustus William Tanner; William Henry White.

SCIENCE STANDING COMMITTEE.

Fellows.—Lewis Angell, M.Inst.C.E.; Delissa Joseph; Hampden William Pratt; John Salmon Quilter; Herbert Duncan Searles-Wood; Percival Gordon Smith; Alfred Saxon Snell; Lewis Solomon; William Charles Street; Benjamin Tabberer.

Associates.—Sydney Benjamin Beale; Henry William Burrows; Max Clarke; Bernard John Dicksee; Matthew Garbutt, Assoc.-M.Inst.C.E.; Charles Henman.

The Hon. Auditors for the past official year, Messrs. Zeph. King and Frederick William Marks, were declared re-elected for the ensuing year.

Election Procedure: Proposed Changes in the By-laws.

The Chairman (Mr. John Slater, B.A.) of the General Meeting of the Institute last Monday announced that the Council had had under consideration the qualifications of Associate Members of Council, and had decided, with a view to giving more scope to the body of Associates in the matter of their representation on the Council, to recommend to the General Body (1) that the second sentence in By-law 29 be altered so as to read "any Associate shall be eligible to serve as an Associate Member of Council." At present, the Chairman said, Associates to be eligible as Associate-Members of Council must have been in independent practice for three years. It was felt that that excluded from the Council a number of gentlemen who, from their position perhaps in official capacities, could not comply with that regulation. The Council had therefore decided to recommend that that rule be altered so as to admit any Associates as Associate-Members of Council. Also (2) that the words "but the names of members of the existing Council shall be distinguished by an asterisk" be omitted from By-law 30, so that when the list went out to the general body there should be no qualifying marks denoting members of the existing Council. Further (3) that the word "twenty-two" in the seventh line of the same by-law be altered to "twenty-eight," so that the Council should be bound to send up at least twenty-eight names in the house list.

The result of the Annual Elections having been announced, and a vote of thanks passed to the Scrutineers,

MR. RALPH NEVILL [*F.*], F.S.A., who had acted as Chairman of the Scrutineers, said he had seen with considerable regret that the scrutiny was in great part a farce, for as regards the Committees there was practically no competition. He had taken a very active part in the starting of those Committees, and he was sorry matters had got into that state. He could not believe that the Institute was without willing hands to serve it, and it could not be for the advantage of the Institute that there should be no change in the Committees and that outside members should not be given a chance to serve. It might be said that it rested with members themselves to propose names for the Committees; but in the old days the Committees themselves took care that there were some extra members nominated, so that there should be a real election. Reading the remarks made by his old friend Mr. Arthur Cates at the Annual Meeting as to the lack of progress made by the Institute, he could not help thinking that it might be partly due to the fact that members were not given the chance of serving, but that the work of the Institute was allowed to lie too much in one set of hands. He himself had made a point of retiring from his Committee, because he had felt that it was not desirable that power should be in the hands of one person, but that it should pass freely round. He ventured to hope that another year the Committees might be able to submit a list which would give members an opportunity of voting and of bringing fresh blood in.

THE CHAIRMAN explained that in most cases the Committees had nominated more names than were required to make up the full strength of the Committees, but some of the nominees had declined to serve; and so the candidates were reduced to the exact number required to make up the Committee.

PROFESSOR KERR [*F.*] said he thought the old system of electing the Council was a very good one—viz. that a certain proportion of the Council (or Committees) went off as a matter of compulsion every year. The consequence was that the Council was put on its mettle to find equally good men, and it became the rule that for a man to get on the Council was a sort of pass and acknowledgment of his merit, which stuck to him for ever. In the last twenty years things had been different, and they appeared to be drifting into what used to be called in politics the close vestry system. Nothing could be more fatal to the Institute. Although there were very good men on the Committees, the younger ones must be given a chance; and those who were coming forward must be encouraged to get on to the Council, to the credit of themselves and the credit of the Institute.

MR. C. H. BRODIE [*A.*] said that a Committee of Associates had impressed upon the Council the absolute necessity, if there was to be any progress in the Institute, of a certain number of members retiring from the Council every year. He had heard with much satisfaction that some reforms were to be brought forward, but he very much regretted that the retirement of a certain number of members of the Council was not to be one of these reforms.

MR. E. W. MOUNTFORD [*F.*] expressed himself in favour of the compulsory retirement of a certain number of the Council every year, but there were great difficulties in the way. The Associates' Committee would be doing a good service if they could produce a thoroughly workable scheme for bringing about such retirement.

MR. BRODIE said that over twelve months ago in a letter to the Council, which was published in the JOURNAL, he had ventured to suggest a way by which the by-laws could be altered. There could have been no more difficulty in altering the particular by-laws referred to in his proposition than in altering those referred to in the propositions of the Council mentioned by the Chairman that evening.

MR. LACY W. RIDGE [*F.*] thought the real difficulty was this: it was not the custom of the Council to watch the progress of members. A man might be a Fellow of the Institute for a great many years, without the duty of serving on a Standing Committee, or ultimately on the Council, ever being brought home to him. The Council should keep a list of persons who were eligible for the office of Vice-President, and a list of Fellows whose turn it was to serve on the Council, and they should be asked to serve as a favour. As far as his experience went, anybody who served on the Council was doing the Institute a very great favour, for a more uninteresting service he had never gone through. It should be put as a duty to these men that they should serve on the Council. Careful watching on the part of the executive was what was required in order to get a change of men on the Council and Committees. By such means the Council and the Standing Committees would get in touch with the members of the Institute and with the architectural profession, in a way that it could not be said they were at the present time.

The Chairman said that the comparatively small alterations the Council proposed to recommend would have to go before a General Meeting, and any suggestions from members would not fail to receive the greatest possible consideration from the Council.

Mr. Ralph Nevill [*F.*] said that when the rules now in force were brought in he advocated very strongly that the same rule should obtain in the Institute as obtained in nearly every public body in the kingdom: that at least a third of the members should retire from the Council every year; but his proposal met with very little support. He hoped they would now take steps to bring the rules of the Institute more into line with those of other bodies of the kind.

The Institute Premises.

At the same Meeting Mr. H. Hardwicke Langston brought forward the motion standing against his name in the notice-paper—viz. "That in the opinion of this Meeting it is desirable to put a suitable and prominent inscription on the street front of No. 9 Conduit Street, indicating that those premises are occupied by the Royal Institute of British Architects." Mr. Langston said that it was contended that under the terms of their lease they were forbidden to put up an inscription such as was suggested in the Resolution. He had read the part of the lease referring to this, and he did not see that it was absolutely prohibited; but even if it were, such a condition could not be binding unless the consent of the general body of members had been obtained to it. The Royal Institute of British Architects fulfilled important public functions; it was an examining body, it was mentioned in various Acts of Parliament, and was empowered to confer diplomas and certificates to aspirants for important public offices. There was every reason to believe that the prestige of the Institute would go on increasing; that the public would look more and more to the Institute as a guide. Let them cease to belittle themselves by any show of false modesty in hiding their name; rather should they endeavour to make their name widely read and known, in recognition of that supreme confidence which they hoped always to deserve.

The Chairman said it would be desirable to read the clause in the lease to which Mr. Langston referred. It was as follows:—"And that they the said Institute their successors or assigns shall not at any time during the said term" (that is, the term of the lease) "without the consent of the said Company" (that is, the Architectural Union Company) "its successors or assigns allow any inscription advertisement or names whatsoever to be inscribed or placed upon in or about the front of the said demised premises or in or about the doors of the vestibule leading thereto, excepting the name and title of the said Institute, subject to the approval of the Board of Directors of the said Company." The Council, continued the Chairman, had had the matter before them that afternoon, and if it was the wish of the Meeting, the Council would do their best with the Architectural Union Company to get the name of the Institute put prominently upon the building.

Mr. Lacy W. Ridge seconded Mr. Langston's proposal. Unless there was some serious reason to the contrary, it should be done.

Mr. H. T. Bonner [*A.*] said he was quite in sympathy with Mr. Langston's proposal, but it did not go far enough. The name of the Institute was totally unknown to the general public. The Institute ought to have a building of its own, like the Engineers, the Surveyors, and other bodies. He was afraid that it would hardly help the dignity of the Institute to put the name up on the front. He should quite agree with the restriction in the lease until they had got a building worthy of their great institution, worthy of that which they thought it should be, and worthy of their great art.

Mr. Hugh Stannus [*F.*] supported the resolution. What was asked for was a very desirable and very proper thing to do. He observed from the wording of the lease that Mr. Langston was right in his contention that they had the power to put the name on their premises, subject to the approval of the Architectural Union Company. The Company were bound to admit the name; they only reserved their approval as to the manner of affixing it. That is to say, whether they should incise it in stone, or put up a painted fascia board, or put a brass plate on each side of the door-posts. He thought it a matter that would be easily settled with the Union Company.

Mr. Ralph Nevill supported the resolution, though he quite sympathised with a previous speaker, and wished that not only the front, but the whole of the premises were the Institute's, but if they waited for that they might wait for ever. At any rate let them have the name, that people could recognise and see it.

Mr. W. Hilton Nash [*F.*], in supporting the resolution, said he hoped this would be the beginning of a much larger question; he hoped it would be the beginning of a fund being started for acquiring a building of their own. That was what they ought to have had years ago. There were a great many wealthy members of the Institute who might be tempted to subscribe for such a purpose. Of course they were not engineers, who made such enormous fees; but they might be content with a much less important building than the Engineers or the Surveyors, or even the Mechanical Engineers. These bodies had their fine buildings; why should not the Architects, who more than any others ought to have a fine building? Why should they not at once start a fund to get their own premises?

Mr. Langston's motion was then put and agreed to.

Report of the Special Committee on Building By-laws in non-Metropolitan Districts.

The business before the Institute last Monday included the consideration of the Report of the Special Committee appointed by the Council in accordance with the resolution passed at the General Meeting of the 16th January last, respecting the administration of local building by-laws in rural districts.* The Committee was composed of the following members:—Messrs. S. Flint Clarkson, H. O. Cresswell, E. Guy Dawber, W. M. Fawcett, M.A., Arthur S. Flower, M.A., F.S.A., William Henman, Lacy W. Ridge, A. E. Sawday, H. D. Searles-Wood, and Professor T. Roger Smith. The Report, which was recommended by the Council for approval and adoption, is as follows:—

The Committee have considered the present condition of Building By-laws in England outside the County of London, and their administration.

Some of the larger municipalities are governed in these respects under private Acts of Parliament, but the great majority of boroughs and urban districts have adopted By-laws under the Public Health Acts which have been confirmed by the Local Government Board, and they are for the most part founded on, though they do not absolutely follow, the Model By-laws issued by that Board.

Around some of the larger centres of population there are urban districts which have obtained the sanction of the Local Government Board to Building By-laws varying in several particulars from the Model By-laws and from one another. This want of uniformity in districts closely adjacent causes inconvenience and irritation to building proprietors as well as to architects.

It is within the powers of rural sanitary authorities to apply for and obtain from the Local Government Board "urban powers," which have been freely granted. They can then adopt the whole of the Model By-laws.

When adopted the By-laws become operative not only in that part of the district which is crowded, but also in its suburbs and outlying districts; and thus a rural district, often extending for miles round the large village or small town which forms its centre, has just the same building regulations as a crowded town.

It is the experience of the Committee that some of the By-laws thus introduced are not well adapted for general use throughout the country, and when applied in connection with ordinary buildings over large areas of a purely rural character, they become oppressive.

The enforcement of unnecessary regulations in respect of matters in which the public has no practical interest seems to the Committee an improper interference with the liberty of the subject.

It gives useless trouble to local authorities.

It multiplies undesirably officials to be paid out of the rates.

It adds unreasonably to the cost of building.

It promotes monotony in design, stultifies invention, and prevents improvement.

It occasionally stops building. More particularly it discourages the erection of cottages for the labouring classes by landed proprietors on their country estates.

Recognising the necessity for such Building By-laws as are proved to be essential to the safety or health of the public, and desiring that the By-laws relating to the same subject should, as far as practicable, be alike throughout the country, the Committee suggest that the Model By-laws should be grouped in divisions as detailed below, in order that buildings in rural localities may be relieved from those divisions which appear inapplicable in such places. In an Appendix [p. 450] they deal in detail with each division so far as amendment appears to them needed therein.

Suggested Divisions.

A. Definition of Terms and Exempted Buildings [Model By-laws 1 and 2].

B. New Streets [3–8].

C. Space about Buildings and Area of Windows [53–58].

D. Structure of Party Walls [25–32].

E. Structure of Walls, Foundations, Roofs and Chimneys [11–23, 33, 34, 36–52].

F. Sanitation, Preparation of Site, and Drainage [9, 10, 17, 52A, 60–89].

In rural districts the Committee consider that A, D, and F would suffice. It might be desirable to add B in the case of any part of a rural district likely to become urban.

Possibly E might be added, to apply only to large public buildings, warehouses, and factories of considerable height. Ordinary shops should not be regarded as other than domestic buildings.

In towns where a competent building surveyor of experience is engaged the whole of the By-laws should be in force. In such places exemptions from certain divisions of the By-laws should be made applicable to particular buildings rather than to districts. The Committee are of opinion that in no case should the exemptions extend to sanitary matters. The exemptions they suggest are set forth in the Appendix, Division A, No. 2.

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* JOURNAL, 28th January 1899, pp. 161–66, 168.

It appears to the Committee that no Model By-laws can be considered complete which do not include those to be enforced by local authorities with respect to the staircases and exits of public buildings and factories, even though authorised otherwise than under the Public Health Acts.

It is of great importance that the requirements of the local authorities as to the deposit of drawings should be reasonable, and that they should be explicitly stated. The Committee suggest that in all cases a block plan, with the lines and depths of drainage shown thereon, together with the nearest public roadway and adjoining premises within 100 feet of the proposed building, should be deposited, and that, where required, plans and sections (together with elevations, if needful to explain methods of construction) should be submitted for inspection during a defined and limited time; which drawings should be then returned, stamped, if approved, or, if not approved, accompanied by a precise statement of the particulars in which the By-laws have not been complied with.

It would be of great advantage if an appeal could be provided to a technical authority as to the meaning and applicability of by-laws.

The Committee have the honour to lay this Report, with the Appendix, before the Council of the Royal Institute of British Architects, and request that it may be submitted to a General Meeting.

It might be well to forward copies to the Allied Societies, for their consideration, before the Meeting is called.*

On the report being adopted, the Committee suggest that the Institute should request the Local Government Board to receive a deputation, whose objects would be to point out to the Board the desirability of altering some of their Model By-laws and arranging them in divisions, and to request the Board to take such steps as may be necessary to bring the new method of administering the By-laws before the notice of the local authorities.

The influence of those who are interested in building would have to be brought to bear upon the local authorities to urge them to give effect to the proposed measures of relief by adopting such, and such only, of the divisions of the By-laws as would be applicable to their districts or to different portions thereof.

SYNOPSIS OF MODEL BY-LAWS AS ISSUED BY THE LOCAL GOVERNMENT BOARD.

NO.			DIVISION
1.	Interpretation of terms	See Appendix,	A.
2.	Exemptions	See Appendix,	A.
3–6.	New streets. *Retain*		B.
7.	New streets.	See Appendix,	B.
8.	New streets. *Retain.*		B.
9, 10, 10*a*, 10*b*.	Sites. *Retain*		F.
11, 12.	Walls.	See Appendix,	E.
13–16.	Walls. *Retain*		E.
17.	Damp course	See Appendix,	F.
18, 19, 20, 21.	Walls	See Appendix,	E.
22, 23.	Walls. *Retain*		E.
24.	Wood in external walls. *Omit.*		
25–32.	Party-walls.	See Appendix,	D.
33, 34.	Support of timbers. *Retain*		E.
35.	Brick nogging. *Omit.*		
36–51.	Chimneys, &c. *Retain*		E.
52.	Roofs. *Retain*		E.
52*a*, 60*a*.	Water on roofs, &c.	See Appendix,	F.
53, 54.	Open spaces	See Appendix,	C.
55, 57.	Windows	See Appendix,	C.
	Heights of stories. *Omit.*		
56.	Ventilation under floors. *Retain.*		C.
58.	Ventilation of rooms. *Retain*		C.
59.	Ventilation of public buildings. *Omit.*		
60.	Subsoil. *Retain*		F.
61–64.	Drainage. *Retain*		F.
65.	Drainage	See Appendix,	F.
66–79.	Drainage. *Retain*		F.
80–85.	Ashpits. *Retain.*		F.
86–89.	Cesspools	See Appendix,	F.
91, 92.	Notices and plans	See Report.	

APPENDIX.

Division A.

DEFINITIONS AND EXEMPTIONS.

Interpretation of Terms.

Model By-laws

No. 1. Terms defined by the Acts under which the By-laws are made should be inserted here for general information.

"Base" of a wall carried on a bressummer should mean the course above the bressummer. See London Building Act 1894.

"Topmost story" should be defined to include a one-story building.

As far as possible the interpretations should accord with the London Building Act 1894.

Exempted Buildings.

No. 2. It is undesirable that any buildings should be exempt in practice from supervision respecting sanitation and drainage; certainly not railway stations.

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* Copies of the Report were sent to the Allied Societies, and their opinion invited thereon, according to the suggestion of the Committee. The replies received were read to the Meeting of the 12th inst., and are printed on pp. 453–54.

No. 2 (*h*) (*i*) (*j*). To be substituted for Model By-law No. 2 (*h*) (*i*) (*j*).

The following buildings to be exempted from all By-laws excepting Division F. (Sanitation &c.).

(*h*) Any building, not being a Public Building or Factory (or which being a Public Building or Factory is one story only in height and is without any gallery), which is situated not less than 15 feet from the boundary of the curtilage thereof.

For the purposes of this By-law two domestic buildings shall be regarded as one building provided they are separated by a party-wall in accordance with Division D.

NOTE.—*This is not intended to exempt any Public Building or Factory from By-laws regulating Exits and Stairs, should such By-laws be introduced.*

(*i*) Any building situated within 15 feet of the boundary of the curtilage, which is distant 15 feet at the least from any public way and from any other building within the curtilage, and does not exceed 600 superficial feet in area nor 15 feet in height, provided that its external or party-wall towards the boundary of the curtilage is constructed as provided for a party-wall in Division D.

(j_1) Greenhouses if not attached to other buildings (see London Building Act).

(j_2) Greenhouses attached to other buildings so far as regards the necessary woodwork of their sashes, skylights, doors, and frames.

Division B.

No. 7 (*c*). Suggested amendment:—He shall construct on one side at least of such street a footway not less than six feet wide.

Division C.

No. 53. Omit 53 in favour of 53A.

No. 54. Add to 54 and its provisos Section 41 London Building Act, part of Subsection i., modified thus:—

Where there is a basement story directly and sufficiently lighted and ventilated, or where the basement story is not constructed or adapted to be inhabited, or where there is no basement story, and where the ground story is not constructed or adapted to be inhabited, the open space required by this section may be provided above the level of the ceiling of the ground story or a level of 16 feet exclusive of lantern lights, measured from the level of the adjoining pavement.

Section 52 of the London Building Act should also be introduced in the following form:—

In the case of domestic buildings and stables or other dependent buildings abutting in the front upon a street and in the rear upon a mews or public way, the sufficient open space provided for the domestic building shall serve also for the stables or dependent building.

It might be desirable to introduce Section 45 London Building Act respecting "Courts within a building."

No. 55. Suggested amendment: Every person . . . shall construct . . . suitable windows in such manner that effectual means of ventilation by direct communication with the open air shall be provided for every habitable room of such building.

NOTE.—*It is not desirable that the heights of stories should be arbitrarily fixed by By-laws.*

Division D.

PARTY-WALLS.

Model By-laws. **Such parts of Nos. 19, 20, 21, and 22 as relate to party-walls, and Nos. 26, 27, 28, 29, 30, 31, and 32.**

Every wall built for the separation of adjoining buildings belonging to different owners or occupied or adapted to be occupied by different persons shall be constructed of good bricks, stone, or other hard and fire-resisting material, properly bonded and solidly put together with good mortar.

Such wall shall in no part be less than $8\frac{1}{2}$ inches in thickness. It may, however, be divided into two thicknesses of $4\frac{1}{4}$ inches by a flue, provided that such flue be pargetted and has an opening into one only of the adjoining premises.

Such wall shall extend from

the foundations or footings up to the underside of the incombustible roof covering, and shall be built or properly corbelled out to the full extent of any projecting string, eaves, or other architectural feature any part of which within 3 feet of the party-wall is constructed of wood or other combustible material.

It shall also be carried up the full width and height of any turret, dormer, lantern light, or other erection on a roof or flat any part of which within 4 feet of the party-wall is constructed of wood or other combustible material.

No timber shall be built into or placed in any party-wall nearer than 4½ inches to the centre line thereof, nor within 9 inches of the inside of any flue or chimney opening, nor within 7 inches of the upper surface of any hearth; nor shall any wooden plug be driven into any such wall nearer than 6 inches to the inside of any flue or chimney opening.

Such wall shall in each of the following cases be carried up above the roof or flat or gutter of the highest building adjoining thereto to such height as will give a distance of at least 15 inches, measured at right angles to the slope of the roof, or above the highest part of any flat or gutter, as the case may be, and shall be properly coped and protected from water soaking into the wall:

(*a*) When either of the adjoining buildings has a roof not externally covered with slates, tiles, metal, or other incombustible material;

(*b*) When either of the adjoining buildings exceeds 30 feet in height, measured from the lowest part of the ground-floor story to the tie of the roof, or to halfway up the gable if the roof has no tie;

(*c*) When either of the adjoining buildings is intended or adapted to be used as a public building or as a warehouse, factory, or workshop.

When either of the adjoining buildings is of the class described under (*c*) and exceeds the dimensions described in (*b*), the wall shall be carried up for a distance of 36 inches above the roof, flat, or gutter, as the case may be, and shall also extend 12 inches higher and wider on each side of any turret, dormer, lantern light, or other erection on a roof or flat any part of which within 4 feet of the party-wall is constructed of wood or other combustible material.

Model By-law.
No. 25.

Buildings adjacent to the boundary of the curtilage thereof.

When the external wall of a new building is within 7 feet 6 inches of any boundary of the curtilage other than a public road, the wall shall be built of incombustible material, and no timber or other combustible material shall be fixed beyond the face of such wall.

Division E.

STRUCTURE OF WALLS, &c.

Model By-laws.

No. 11. Add:—Any story in a roof, and the story immediately below the roof not being the ground story of a detached or semi-detached domestic building, may be enclosed with timber studding, not less than 4 inches thick, properly framed, covered externally with weather-tiling or plastering, and internally with plaster work covering the whole surface excepting the necessary openings. Such enclosure, when properly corbelled out, may overhang the wall below provided the soffit be plastered.

No. 18 (iii.) Add to 18 (iii.):—A pier not less in width and breadth than twice the thickness of the wall as defined for each story, and standing on a solid foundation, shall be deemed to be a return wall for the purposes of measuring the length of walls.

Nos. 19 & 20. Omit "and every party-wall," and add in both cases:—The minimum thickness of every party-wall shall be 4½ inches less than that prescribed for an external wall of corresponding height and length, but in no case less than 8½ inches.

Add to 19 (not 20):—Where the wall of any domestic building, hereby required to be 13½ inches or more in thickness, is covered externally with tiles or other similar incombustible and impervious material securely fastened thereto, the said thickness may be reduced by 4½ inches, provided that such reduction shall not be made on more than one story nor on any ground story nor on any story exceeding 10 feet in clear height.

No. 24. Omit 24. See sec. 55, London Building Act 1894.

No. 35. Omit. There is no corresponding rule in the London Building Act 1894.

No. 52A. Omit. See Division F, substituted By-law.

Division F.

SANITATION, PREPARATION OF SITE, DRAINAGE.

Model By-laws.

No. 17. Substitute "floor" for "timbers" in line 5. In the second paragraph a vertical damp-course should be substituted for the hollow wall described.

Nos. 52A & 60A. Substitute the following:—Every person who shall erect a new building shall make suitable provision for carrying off the rain-water from the roofs, flats, gutters, and areas in such manner as not to cause dampness in any part of the walls or foundations of such building or any adjoining building.

No. 65. It should be made to appear that this applies only to foul drains.

Nos. 86 to 89. The provisions respecting cesspools are unpractical and unsatisfactory. The question of the disposal of sewage where no sewers are available requires reconsideration under modern conditions.

The adoption of the Report having been moved by the Chairman, the following letters relating thereto were read by the Secretary:—

22, *Market Place, Durham: 8th June* 1899.

Dear Sir,—With respect to the Committee's Report on the above subject, there are two by-laws in force in this district, and I believe in many other districts also, which I see are not referred to in the Committee's Report, but which I consider are well worthy their attention. I think they are harsh and unreasonable, and are calculated to restrict building enterprise to a very large extent.

The first is No. 4, affecting the width of streets. I admit that it is advisable that a new street should not be less than 36 feet wide. But supposing two owners have land adjoining one another, and a new road is to be formed on the boundary between the two properties, which owner has to give up the land to form the new road? As the by-law stands, the owner who *builds first* must give the entire strip 36 feet wide to form the new roadway, or he will not be allowed to build. *Then* the owner on the opposite side may step in and build right up to the extreme edge of his land and not give up a single inch, *because the 36-feet roadway is then in existence.* This is manifestly unfair, and must and does deter many persons from building. In my opinion, where a building owner only intends to build on one side of the street, then half the full width—viz. 18 feet—only should be enforced; then, if the adjoining owner wishes to build also (on the opposite side), he should also give up a width of 18 feet also; thus, when the street is completed, the full width required (36 feet) will then be obtained.

The second is No. 19 (*a*), affecting the thickness of walls. Where a wall does not exceed 25 feet in height and does not comprise more than two stories, it shall be 9 inches thick for its whole height; but if it comprises more than two stories (say three stories), then it shall be 13½ inches thick *below the topmost story* and 9 inches the rest of its height—that is, in the whole of the *two* lower stories the walls must be 13½ inches thick. In my opinion this ascending scale commences with too great a jump, and that in such cases the *bottom story* walls only should be made 13½ inches thick, and the *two upper* story walls remain 9 inches thick, especially so when this by-law affects the party walls between a number of houses in a row or street.

Yours truly,

The Secretary R.I.B.A. H. T. Gradon.

Birmingham Architectural Association, Queen's College, Paradise Street: 9th June 1899.

Dear Sir,—In further reply to yours of the 18th ult., enclosing report of the Committee appointed by the R.I.B.A. to consider and report upon the administration of by-laws in non-Metropolitan districts, the report and appendix have been referred by the R.I.B.A. Council to our Committee on Building By-laws, who have for a considerable time past endeavoured in various ways to secure an improvement in the local by-laws and their administration. They, having considered the report and appendix, desire me to inform you that they gladly welcome the action taken by the R.I.B A., and are of opinion that their Committee have dealt with the different points in a manner which meets with the approval of our Committee, and has their sympathy and support.

There are two points dealt with which have been particularly under their attention, namely the heights of rooms or stories, and the thickness of walls with piers in them, and they are glad to see that both these matters have received attention.

As, however, our Committee consider that friction more often results from the administration than from the spirit of the by-laws, they think it would be well to draw particular attention in the report to the fact that mere regulations which have not received the sanction of the Local Government Board cannot legally be enforced.

On November 15th last I forwarded you a cutting from the *Birmingham Daily Post* giving a summary of what was then being done by our Committee and the way in which they were endeavouring to bring the question before the public.—I am, yours truly,

The Secretary R.I.B.A. C. Silk, *Hon. Sec.*

Leicester and Leicestershire Society of Architects: 10th June 1899.

Dear Sir,—In reply to your letter of the 18th of May respecting "The Administration of Building By-laws in Rural Districts," with your Committee's Report thereon, I beg to state that they have been laid before my Council and that generally speaking they acquiesce in the Report.

The Report was discussed, but no one clause was particularly voted as calling for special comment from my Council.—I am, dear Sir,

Yours faithfully,
Howard H. Thomson, *Hon. Sec.*

The Secretary R.I.B.A.

Mr. Lacy W. Ridge [*F.*] seconded the Motion. He was glad to hear the communication from Birmingham, as Mr. Henman had taken a great interest in the question. With regard to Mr. Gradon's communication, it was unfortunate that it had come now instead of when communications were invited. He was quite familiar with both the points Mr. Gradon raised. The London Building Act met his first objection by setting out the roads from the centre line of the old road, that is to say, each landowner was asked for half the road. They were also quite familiar with the difficulty about the 25-feet wall, but they did not care to tackle the whole question of the thickness of walls. The question of the party wall, however, they met by suggesting that where a brick and a half was required for external walls the party wall might be half a brick less than the external wall. They hardly expected absolute unanimity with regard to the whole of the Appendix, and they hardly expected that the Local Government Board would adopt the Appendix bodily. Nevertheless, it had been very carefully drawn up, and he believed its adoption would be a great relief to those who build outside the metropolitan district. Their main principles were that by-laws should be as much alike as possible throughout the whole country on the subjects on which they treat, that by-laws should not necessarily be enforced in places where the public had no interest in interfering with the way in which people built. At the present time there was a great deal of unnecessary interference, because the same by-laws which were applicable to a crowded town were applied in an open field. They had divided up the by-laws in such a way that while some were applied, others could be left out in cases where circumstances so required.

Mr. William Woodward [*A.*] felt sure that he should have the Meeting with him in saying that a more sensible, careful report had never emanated from any Committee of the Institute. It had evidently been considered with so much care, and was the result of so much experience, that he should not attempt to discuss it. With regard to the clause "When adopted the by-laws become operative not only in that part of the district which is crowded, but also in its suburbs and outlying districts; and thus a rural district, often extending for miles round the large village or small town which forms its centre, has just the same building regulations as a crowded town," it should be borne in mind, that what was to-day a suburb might, in the course of a few years, become part of a crowded town, and therefore it would not be wise to at once eliminate the regulations and rules from that suburb. But that objection was met by a singularly wise paragraph towards the end: "It would be of great advantage if an appeal could be provided to a technical authority as to the meaning and applicability of by-laws." Therefore, supposing it was objected that a by-law which applied to a crowded town should not apply to an outlying district, that would be met at once by reference to this technical authority. Then, with regard to the enforcement of unnecessary regulations, the Report said: "The enforcement of unnecessary regulations in respect of matters in which the public has no practical interest seems to the Committee an improper interference with the liberty of the subject"; and the Committee very wisely gave their reasons for that opinion. That was one of the objections raised at Birmingham, and not only could it be well raised in Birmingham but also in London. Such improper interference with the liberty of the subject conduced neither to excellent construction nor to sanitary improvement, and irritated those who had to conform to an Act or to build either in London or in the provinces. If there could be a clause at the end of the Building Act of 1894 to the same effect as that at the end of the Report, it would conduce to the happiness of every architect practising in London, and to that good feeling which should exist between architects and district surveyors, whether in London or in the Provinces. With regard to the sentence "The Committee are of opinion that in no case should the exemptions extend to sanitary matters," that was an exemption which did not affect the points to which he had referred. As to the requirements of local authorities, the Committee suggested that in all cases a block plan should be sent; and he was happy to find that the Committee had omitted any reference to the scale of that block plan. Those who had to send in drawings to the London County Council would agree that when an absolute scale was enforced upon them it meant considerable trouble which was altogether unnecessary. The Ordnance Survey would probably supply the London County Council with all that was necessary. Then it said a little further on, "together with the nearest public roadway and adjoining premises within 100 feet of the proposed building." As to those words "within 100 feet," he submitted this involved a little unnecessary trouble on the part of the architect. All one should be required to show would be the building immediately adjacent to the building that was the subject of one's application. At the end of the same paragraph were the words—"which drawings should be then returned, stamped, if approved, or, if not approved, accompanied by a precise statement of the particulars in which the by-laws have not been complied with." That was an opinion which he hoped would be communicated to the London County Council. One excellent addition to the Building Act as it was amended in 1894 was that the Council should give their reasons for any particular alterations they wished made, and if this was done in detail it would be a considerable advantage to architects. The result of the deputation proposed by the Report he was sure would be of considerable advantage to everybody practising in the provinces. He considered the Committee deserved the warmest thanks of the Institute for their very sensible and skilful report.

Mr. E. W. Hudson [*A.*], referring to Mr. Woodward's remarks, considered it absolutely necessary to show more of the buildings than simply the adjoining building. If it were a question of the frontage line, and one showed only the frontage of the adjoining building, a building line might be shown which was no building line whatever; it might be simply set back beyond the actual building line. In such a case one would be sending up a plan which would possibly be sent back.

Mr. P. Gordon Smith [*F.*], Architect to the Local Government Board, said the Report had his entire sympathy. The whole question, however, was full of difficulty, because it opened up certain alterations in the legislation that had hitherto guided them. The law allowed any rural district council to apply for urban powers, and it would be a very grave responsibility for the Local Government Board to take if they were to refuse to grant urban powers to any place that applied for them. He did not think they would get any Government Department to take that responsibility. The proposals, however, certainly had a great deal to commend them to those in authority, and he would do all in his power to bring them about.

Mr. Ralph Nevill [*F.*], F.S.A., said that having come very much in contact with urban authorities, and finding himself extremely hampered by them in purely rural districts, he could not agree at all with what Mr. Gordon Smith had said. The Local Government Board, he thought, was especially intended to keep local authorities in order, and prevent their usurping too much authority or misusing their authority. The most unreasonable requisitions were made, and he spoke as one who had lived in old houses and knew a good deal about them. For instance, take the question of height, which was left indefinite in the Report. He would suggest that the 8 feet 6 inches height, which was commonly prescribed in by-laws, was most unreasonable. He would suggest that the deputation, if they could not carry the omission of a definite height, should at any rate get the Board to restrict it to 8 feet, which used to be the limit; and not only to restrict it to 8 feet, but to allow that to include the ceiling and floor, because that made a difference of 3 inches at least. As to the two stories referred to by Mr. Gradon, that was a very vexatious regulation, because it was interpreted to mean that if one had a gable, or even a half gable, one was forced to build the two stories below it 14 inches, which was quite unnecessary in a cottage or a small building. If there were a third story on the top it would not matter, but the rule was interpreted to mean that they could not even fill up the gable with wood framing without two 14-inch walls below. He would ask the deputation to introduce something to exclude such cases from the operation of that rule. That was a very important point, because it often forced an architect to hip a roof when he did not want to go to expense simply to avoid having that extra 4½-inch wall. In cottage building one had to consider every pound spent. As to the relation between wall-space and windows, the London County Council rule in that respect was less strict than that enforced in country districts, where if there were rooms entirely in the roof, going right up into the roof and very capacious, the windows must have one-tenth of the floor space. The London County Council required only one-twelfth, and that was quite bad enough. The consequence was that absurd malpractices went on; a match-board partition was put up to cut off the bedroom, and after the buildings had been passed, the match-board was taken down and the room reverted to its full size. Then allusion was made to timber buildings. In the country for years and years he had been in the habit of building timber in particular ways of his own—a combination of timber and concrete. But unless he got special permission he could do that no longer; he was obliged to go back to some utterly ridiculous and bad system of building: one must not introduce a single new thing. The one thing he regarded as absolutely essential was concrete under the ground floors, and that was not insisted upon in many by-laws. Then there was a point which affected him very much in his mode of building. He wanted the deputation to point out that a foundation of cement concrete was equivalent to footings of brick or of anything else; that if the foundation was made of cement concrete it dispensed with the need of footings of stone or brick. It was difficult to persuade a country surveyor or the people who had authority that there was not some subtle merit in bulging the walls at the bottom with bricks or stone; but a little reflection would show that the wall was none the stronger for this so long as there was a firm basis at the bottom. It did not matter where the horizontal join came so long as the bottom was solid. Being asked how much concrete he used, Mr. Nevill said it depended on the footing, but a foot of concrete was plenty for a small building. The quantity depended upon circumstances. Cement concrete was quite as strong as, or stronger than ordinary brickwork. He feared he ought to have made these remarks beforehand, but he thought they should have an opportunity of discussing the matter, and it was not very easy to find time to sit down and write them out. He hoped the matter would be even a little more threshed out than it had been, now that it had been brought prominently before the Institute, and that it would be pushed very strongly.

Professor Kerr said that the proposal that there should be a tribunal of some sort had struck him as a matter of great interest and novelty. There was one drawback in building all over London. He was constantly met with cases in which a difficulty had unexpectedly arisen with regard to the interpretation of the Building Act. If a tribunal of a very simple kind could be set up—he did not mean a State tribunal, but some sort of tribunal such as was suggested in the Report—whereby there might be a means of clearing up difficulties by the making of by-laws and the administration of them; if that could be set up, he was sure it would do a great deal of good in London, and he had no doubt it would in the country. His advice, when there was any difference of opinion as to the meaning of words in the Act, was to leave that to the lawyers; but there could not possibly be any doubt as to the intention, between the district surveyor as an architect and the builder as a builder, therefore carry out the intention. That, he believed, was the right way to administer the building laws. If some inconvenient regulation of a superficial character had crept in, why could not somebody usurp authority and dispose of it? No man accustomed to transact public business could do it without usurping authority in the interest of good sense. [Mr. Gordon Smith observed that a tribunal such as had been suggested would be admirable.] Continuing, Professor Kerr said that in London he had been under the impression that it was as well to act with something like common sense. That was how he did it. He stood not upon the letter of the law, but upon principle.

Mr. Lacy W. Ridge, replying to some of the points raised, said that the reason why the remarks about the height of the rooms appeared in italics was, that these regulations were not in the model by-laws at all. They had only been recently introduced in certain places. With regard to the tribunal, he was extremely glad that this had Mr. Gordon Smith's approval, because if there was a difficulty about such things in London, how much greater were the difficulties with a small rural board which knew absolutely nothing about building, and only employed an inexperienced surveyor. Such boards thought they were bound to enforce these by-laws, and absolutely without discretion. He could not agree with Mr. Gordon Smith with regard to the duty of the Local Government Board. If the Local Government Board did not moderate laws of this sort, and point out to small local authorities that they were assuming to themselves powers unfit for the work they had to do in their particular case, it seemed to him that the Board was not doing what Parliament intended them to do.

The Chairman, in putting the motion, observed that it must be a source of great gratification to Mr. Ridge to find the almost unanimous agreement of the meeting with the conclusions at which the Committee had arrived.

The motion was carried unanimously.

Party Structures.

The Chairman then referred to the resolution on Party Structures which appeared on the notice-paper, and moved as follows: "That the Royal Institute of British Architects petition the Local Government Board to promote a Bill in Parliament to regulate the procedure in dealing with party structures in a similar manner to the London Building Act 1894, in all parts of England where there are no Acts of Parliament dealing with such party structures."

Professor Kerr having asked whether that referred to the tribunal of three surveyors, and being answered in the affirmative, said that nothing could be more useful than that enactment of the Building Act. Partnership disputes were always exceedingly difficult to settle, and exceedingly expensive and troublesome. A party wall was a wall in joint ownership; each of the owners possessed an undivided moiety of the whole. Consequently if, as a partnership property, anything of importance had to be done with that wall, the danger was that they might get into the hands of the lawyers and never get out again. Consequently the Legislature had most wisely appointed a peculiar special tribunal—a tribunal of three surveyors, and if the proposal was that that should be extended over the whole country, no one who had had experience of the London Building Act could possibly differ. He seconded the motion with pleasure.

Mr. Ridge said that this resolution was brought forward by a member of the Special Committee; but the Committee did not take it up originally because their object was in their Report to keep within the existing law. They did not wish to take the responsibility of anything which would necessitate an Act of Parliament, and therefore they referred the resolution to the Council. The Council referred it back to the Committee, and the Committee highly approved it. He thought the feeling was exactly that which Professor Kerr had expressed, that the system found most useful within the Metropolitan district would be most useful outside London.

Mr. Woodward, under a misapprehension as to the nature of the tribunal referred to, which he assumed to be the London Tribunal of Appeal, suggested the addition of certain words to the resolution.

The Chairman explained that the tribunal consisted simply of the three surveyors, and referred to the party wall question solely.

Mr. S. Flint Clarkson [*F.*] pointed out that the tribunal of appeal referred to was not a tribunal of appeal in the sense of the 1894 Act, but the official referees of the 1844 Act. The official referees had practically certain powers of legislation, and that was what had been acted upon in the non-Metropolitan by-laws.

The resolution was then put and carried unanimously.

Sir L. Alma-Tadema, R.A.

Mr. J. M. Brydon, at the conclusion of the business before the Meeting last Monday, asked permission to introduce a motion, which, though not on the agenda, would, he was sure, be met with the most cordial approval of all present. Since the last Meeting, the Queen's Birthday Honours had been announced, and amongst the names of the individuals distinguished by the honour of knighthood was that of their Honorary Associate, Mr. Alma-Tadema, R.A. Sir L. Alma-Tadema had done yeoman service as a member of the Art Committee. He had attended their Meetings and helped them on any question connected with his art, and what he (the speaker) wished to propose was that the Meeting should send in the name of the Institute a note of congratulation to Sir L. Alma-Tadema on his good fortune. He felt it would be a graceful thing for the Institute to do, to recognise in this way the honour conferred upon their distinguished member, and he thought it would be singularly appropriate that the Institute should pass a vote of congratulation on this occasion.

Mr. E. W. Mountford seconded the motion, which was thereupon put from the Chair and carried by acclamation.

Secret Commissions.

With reference to the paragraph in the last issue of the Journal, p. 434, in which attention was drawn to a line in a circular from Messrs. De Grelle, Houdret & Co., a letter has been received from that firm stating that the line in question, "the prices enclosed are subject to 10 per cent.," referred in no way to a secret commission to the architect, but simply informed the addressee of the price at which goods were supplied to the building trade. In these circumstances the Editor of the Journal has much pleasure in withdrawing any suggestions unfavourable to Messrs. de Grelle, Houdret & Co., and regrets the original misunderstanding.

Architecture and Engineering [p. 435].

Mr. Henry Lovegrove [*A.*] writes:—

I have used the Ludgate Hill Station since 1867 (London, Chatham and Dover, not South Eastern, as stated on page 435), and I agree with Mr. John Hebb as to the ornamentation of the railway viaduct. My opinion may not be worth much, but I consider that the various railway bridges, and there are many of them, crossing the Dulwich College Estate are very satisfactory, and it has been stated that these bridges were designed by Mr. Charles Barry, Past President R.I.B.A., who also designed the pretty little front to the North Dulwich Station.

I still adhere to what I said concerning the Tower Bridge at a recent meeting. The towers were designed by the late Sir Horace Jones; but Sir J. Wolfe Barry found it necessary to have a clothing only of stone instead of the red brick walls as designed, and the details were altered by Mr. G. D. Stevenson. Drawings of the original design and of the altered design can be seen at the Guildhall through the courtesy of Mr. Andrew Murray, City Surveyor.

REVIEWS.

ENGLISH CATHEDRALS.

English Cathedrals. Illustrated. By Francis Bond, M.A., F.G.S., Hon. A.R.I.B.A. 8o. Lond. 1899. [George Newnes, Limited.]

This book is an "attempt to make the study of the English cathedrals more interesting." Taking up the subject-matter as it occurs, we find in the introduction the statement: "It has not been possible to insert plans in the book; it seemed hardly desirable to do so." The author then refers the reader to the valuable plans published in *The Builder*, and rightly states that "the student should never visit a cathedral without one of these plans." But, even with this statement, the omission of plans is a very serious one. At least one plan should have been inserted at that part of the introduction where he explains the nomenclature of the parts of a cathedral, which would have greatly helped the reader to understand the letterpress.

The author says: "Much time and trouble have been spent in the endeavour to correct the current chronology of the cathedrals. The subject is a difficult one. Suffice it to say that I have relied rather on architectural than on documentary evidence." To do this for *all* the cathedrals of England and Wales means an enormous amount of study; in fact, my experience is that the determination of the date for one cathedral alone from the architectural evidence mainly, involves much study for a long period.

In a book like this, which is intended to be a popular one, it would be better not to have written so strongly about their design as the author does. To take one example only. He says on page 60 that the vaulting of the eastern transept at Durham Cathedral is "singularly clumsy and ugly." Now here he should have explained his reasons for this statement, for, if my memory serves me rightly, the detail is very good indeed; while in Canon Greenwell's *Address on Durham Cathedral*, page 58, I find the reason for the peculiar planning of the vault.

The author states that he has studied all the English cathedrals on the spot, but that he had the misfortune to lose the whole of his notes and the greater part of his completed manuscript, which loss must have been a great hindrance to the successful completion of his book. He classifies the cathedrals as follows:—Thirteen cathedrals of the Old Foundation, thirteen of the New Foundation, and eight Victorian cathedrals; then eleven churches of Benedictine monks, four churches of regular canons of the Augustinian Order, two collegiate churches of secular canons, and four parochial churches. But in the body of his book he arranges them alphabetically, except the five Victorian cathedrals of Liverpool, Manchester, Newcastle, Truro, and Wakefield, and the four Welsh cathedrals, of which he writes shortly at the close of the volume, next to a short glossary which is placed at the end. He bases his classification of the periods of English ecclesiastical architecture on Mr. Sharpe's *Seven Periods of English Architecture*, but he does not directly explain on what Sharpe based his classification. My experience is that Rickman's classification is much the better one, and that the terms given to the periods by him are more readily understood than those of Sharpe.

On page 2 the author says that the pointed arch was introduced "at first chiefly in arches of minor importance, or merely decorative." Now Sharpe distinctly states, and rightly too, that in the earlier buildings of the Transitional period the pointed arch is used in the arches of construction only . . . whilst the circular arch is used in the arches of decoration only.

In a short review one cannot enter into the author's description of all the cathedrals, but the impression that I have formed after carefully reading it, is that it is an interesting book. The author writes enthusiastically and well. There are 180 illustrations from photographs throughout the book, most of them being small. One good point which he mentions is that the magnificent series of chantries in Winchester Cathedral "form a continuous record of Perpendicular and Tudor architecture from 1366 to 1555."

In closing, I should draw attention to one slip, which is on page 297, where, in referring to the open-crown spire at Newcastle Cathedral, the author states that spires of similar construction occur in the Tron Steeple, Glasgow, and elsewhere: this should read the *Cross* Steeple.

Glasgow. CHARLES GOURLAY.

MINUTES. XV.

At the Fifteenth General Meeting (Business) of the Session, held Monday, 12th June 1899, at 8 p.m., Mr. John Slater, B.A. [*F.*], in the Chair, with 16 Fellows (including 7 members of the Council) and 13 Associates, the Minutes of the Special and General Meetings held 29th May [p. 436] were taken as read and signed as correct.

The decease was announced of Thomas Cooke Nicholson, *Fellow*.

The receipt of donations to the Library was announced [see *Supplement*] and an expression of thanks to the several donors was ordered to be entered on the Minutes.

The Chairman referred to proposals of the Council respecting the extension of the class eligible to serve as Associate-Members of Council, and as to a change of procedure in the matter of elections to the Council, and, having indicated the changes in the By-laws which would be necessary to give effect to such proposals, stated that a meeting of the General Body would be called to discuss the matter at a convenient date [see p. 446].

The Chairman read the Reports of the Scrutineers appointed by the Annual General Meeting to conduct the election of the Council and Standing Committees. The following were declared to be the results:—

The Council.

PRESIDENT.—William Emerson [unopposed].

VICE-PRESIDENTS (4).—John McKean Brydon; William Milner Fawcett; Henry Louis Florence; Edward Augustus Gruning [unopposed].

HON. SECRETARY.—Alexander Graham [unopposed].

MEMBERS OF COUNCIL (18).—Aston Webb, 485; Thomas Edward Collcutt, 440; Edward William Mountford, 424; Henry Thomas Hare, 423; John Alfred Gotch, 406; James Brooks, 386; William Douglas Caröe, 384; Leonard Stokes, 382; Richard Phené Spiers, 380; John Slater, 361; Thomas Blashill, 359; Beresford Pite, 359; Henry Heathcote Statham, 356; Paul Waterhouse, 350; John James Burnet, 346; Sir John Taylor, 338; Edwin Thomas Hall, 327; Frank Thomas Baggallay, 321. Not elected:—*William Young*, 320; *Percival Gordon Smith*, 312; *Benjamin Ingelow*, 295; *Thomas William Cutler*, 284; *Sidney Robert James Smith*, 262; *Ralph Selden Wornum*, 230.

Associate-members of Council (2).—Henry Vaughan Lanchester, 279; James Sivewright Gibson, 266. Not elected:—*John William Simpson*, 204; *Francis Thomas Wilberforce Goldsmith*, 179.

Representatives of Allied Societies (9).—Thomas Drew, *R.H.A.* (Royal Institute of the Architects of Ireland), 426; Charles Busteed Fowler (Cardiff, South Wales, and Monmouthshire Architects' Society), 392; Robert Isaac Bennett (Manchester Society of Architects), 368; Joseph Smith (Sheffield Society of Architects), 358; Robert Evans (Nottingham Architectural Society), 357; William Glover (Northern Architectural Association), 354; Albert Edwin Sawday (Leicester and Leicestershire Society of Architects), 354; James Crocker (Devon and Exeter Architectural Society), 348; David Barclay (Glasgow Institute of Architects), 346. Not elected:—*William Larkins Bernard* (*Bristol Society of Architects*), 343; *Thomas Martin Cappon* (*Dundee Institute of Architecture*), 256; *James Souttar* (*Aberdeen Society of Architects*), 248.

Representative of the Architectural Association (London).—George Halford Fellowes Prynne [unopposed].

[The above members declared to have been duly elected compose the Council.]

Auditors.—Zephaniah King, *Fellow*; Frederick William Marks, *Associate* [unopposed].

Art Standing Committee.

Fellows (10).—Ernest George, 467; John McKean Brydon, 462; Henry Thomas Hare, 445; Edward William Mountford, 427; Alfred Waterhouse, 426; William Douglas Caröe, 411; John Macvicar Anderson, 404; James Brooks, 388; Henry Heathcote Statham, 366; William Young, 360. Not elected:—*George Campbell Sherrin*, 326.

Associates (6).—James Sivewright Gibson, 457; Andrew Noble Prentice, 453; Robert Shekleton Balfour, 446; John William Simpson, 443; Henry Vaughan Lanchester, 442; William Henry Romaine-Walker, 434.

Literature Standing Committee.

Fellows (10).—Alexander Graham, 444; William Alfred Pite, 442; Henry Louis Florence, 437; Richard Phenè Spiers, 435; John Tavenor Perry, 420; Paul Waterhouse, 410; Benjamin Ingelow, 404; Henry Heathcote Statham, 404; John Bilson, 370; Sydney Smirke, 369. Not elected:—*John Hebb*, 307.

Associates (6).—Arthur Smyth Flower, 394; Percy Scott Worthington, 378; Andrew Noble Prentice, 366; Leslie Waterhouse, 366; Ravenscroft Elsey Smith, 331; John Humphreys Jones, 294. Not elected:—*Edward William Hudson*, 290; *Hubert Christian Corlette*, 242.

Practice Standing Committee.

Fellows (10).—Joseph Douglass Mathews, 469; Samuel Flint Clarkson, 460; Walter Hilton Nash, 458; James Osborne Smith, 450; Beresford Pite, 446; Thomas Batterbury, 468; George Hubbard, 458; Alexander Henry Kersey, 452; Thomas Harris, 447; Edmund Woodthorpe, M.A. Oxon., 437.

Associates (6).—William H. Atkin-Berry, 479; Herbert Hardwicke Langston, 458; Sydney Perks, 455; Augustus William Tanner, 469; Charles Henry Brodie, 455; William Henry White, 454.

Science Standing Committee.

Fellows (10).—John Salmon Quilter, 466; Lewis Angell, 463; Percival Gordon Smith, 461; Alfred Saxon Snell, 461; Herbert Duncan Searles-Wood, 460; William Charles Street, 457; Hampden William Pratt, 456; Benjamin Tabberer, 446; Lewis Solomon, 443; Delissa Joseph, 416.

Associates (6).—Matthew Garbutt, 351; Max Clarke, 338; Bernard John Dicksee, 306; Charles Henman, 280; Henry William Burrows, 266; Sydney Benjamin Beale, 246. Not elected:—*George Pearson*, 245; *Robert Langton Cole*, 236; *Owen Fleming*, 232; *Arthur Richard Mayston*, 168.

A vote of thanks to the Scrutineers* was unanimously agreed to, on the motion of the Hon. Secretary.

The following candidates for membership were elected by show of hands under By-law 9—namely:—

As Fellows (5).

GEORGE FREDERICK BODLEY, A.R.A., *Royal Gold Medallist Elect*.

EDWIN ARTHUR JOHNSON (Abergavenny).

GEORGE AUGUSTUS BLIGH LIVESAY [*A.*, *qualified* 1895] (Boscombe, Bournemouth).

EDWARD ARDEN MINTY [*A.*].

ANDREW MURRAY [*A.*].

As Associate.

JASPER WAGER [*Qualified* 1898].

As Hon. Corr. Member.

COMTE PAUL DE SUZOR, Member of the Imperial Academy of Fine Arts, St. Petersburg (St. Petersburg).

On the motion of Mr. H. Hardwicke Langston [*A.*], seconded by Mr. Lacy W. Ridge [*F.*] [p. 448], it was

Resolved, That in the opinion of the Meeting it is desirable to put a suitable and prominent inscription on the street front of No. 9 Conduit Street, indicating that those premises are occupied by the Royal Institute of British Architects.

The Report of the Special Committee appointed by the Council to consider the Administration of Building By-laws in non-Metropolitan Districts having been presented and considered, on the motion of the Chairman, seconded by Mr. Lacy W. Ridge [*F.*], the Report was agreed to, and adopted *nem. con.* [p. 449].

On the motion of the Chairman, seconded by Professor Kerr [*F.*], it was

Resolved, That the Royal Institute of British Architects petition the Local Government Board to promote a Bill in Parliament to regulate the procedure in dealing with party structures in a similar manner to the London Building Act 1894 in all parts of England where there are no Acts of Parliament dealing with such party structures.

Further, on the motion of Mr. J. M. Brydon [*F.*] [p. 457], seconded by Mr. Ed. W. Mountford [*F.*], it was

Resolved, That the Institute do offer their cordial congratulations to Sir L. Alma-Tadema, R.A., *Hon. Associate*, upon the Knighthood conferred upon him in the recent distribution of the Queen's Birthday Honours.

The proceedings then closed, and the Meeting separated at 9.45 p.m.

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* The Scrutineers were Messrs. Ralph Nevill, T. H. Watson, H. Hoyne Fox, H. H. Langston, and Frank J. Potter for the Council lists; and Messrs. Percivall Currey, Thomas A. Pole, John S. Quilter, and H. H. Collins for the Standing Committees. The Scrutineers report that 543 voting-papers were received; and that of the voting lists for Ordinary Members of Council, 7 were spoilt or blank, for Associate-Members 41, and for Representatives of Allied Societies 31.

LEGAL.

Architects' Charges.

PERRY AND REED *v.* BURNEY AND GRIMES AND ANOTHER.

This case came before the Lord Chief Justice and a special jury on the 1st May. The plaintiffs, Messrs. Perry and Reed, architects, of John Street, Adelphi, sought to recover from the defendants a sum of £1,030 15*s.* 11*d.* for professional services rendered by them. The defendants, Messrs. Burney & Grimes, of 343, Strand, and the other defendant, Mr. Albert Mathams, were owners of the King's Head Hotel, Margate, and in September 1897 they consulted the plaintiffs with regard to alterations they proposed to make in the structure of this hotel. The amount they were prepared to spend was about £8,000. After some negotiations it turned out that it would be necessary in rebuilding the frontage of the hotel to set back the wall, and this involved extra expense. The plaintiffs prepared the plans and submitted them to the licensing committee and town council, and they were duly passed. Tenders for the work were then invited, and the lowest that was received was £14,790. The defendants considered this was too high a price, and refused to spend more than £10,000, and they asked the plaintiffs to reduce their estimate. Fresh plans were prepared by the plaintiffs, and they applied to the defendants for payment on account. No notice was taken of the application, but the defendant Mathams referred the plaintiffs to Messrs. Burney & Grimes, as he stated he had sold his interest in the hotel. Messrs. Burney & Grimes declined to pay the amount claimed, on the ground that the plans were to be prepared on the basis that the alterations to be made were not to cost more than £8,000. They, however, paid £100 into Court to meet the claim against them.

The jury found a verdict for the plaintiffs for £800.

Judgment was given accordingly.

Mr. Tindal Atkinson, Q.C., and Mr. Whately appeared for the plaintiffs; and Mr. Foote, Q.C., and Mr. Montague Lush for the defendants.

The London Building Act: "Public Building."

LONDON COUNTY COUNCIL *v.* GUARDIANS OF ST. LEONARD'S, SHOREDITCH.

On May 5, at Worship Street Police Court, before Mr. Fordham, the Guardians of St. Leonard's, Shoreditch, were summoned by Mr. Meeson, one of the district surveyors for Hackney, for using a public building which was not constructed in accordance with his requirements. The case, according to the report in the *Law Journal*, turned on the effect of sections 78 and 79 of the London Building Act, and the definition of "public building" contained in section 5, subsection 27, of the Act, which includes schools, colleges, and workhouses.

Mr. Milner Jutsum appeared in support of the summons, and explained that the guardians had taken a large private house in the Clapham Road for the accommodation of about thirty workhouse children and three attendants. Certain alterations were made; but Mr. Meeson held that the building, being put to this use, became a public building, and he insisted that a separate staircase should be provided in case of fire. The guardians replied that the new premises were opened under an order of the Local Government Board, and that the children were simply meant to sleep there and to be there during the time that they would not be receiving instruction at a neighbouring Board school. The question for the magistrate to decide was whether this was a public building or not. The surveyor was of opinion that it came within the definition of the Act, "schools, workhouses, or buildings used for any other public purpose," and that it should have full protection in the case of fire. He need only remind the magistrate that in a similar building at Forest Gate several children were burnt to death.

Mr. Glen, for the defence, admitted the facts, but contended that the section of the Act did not apply to this case. This was not a public building in any sense of the word. The magistrate might be asked to hold that every cottage in which a pauper child was boarded out was a public building.—Mr. Milner Jutsum, in reply, said that this was a building which was occupied by pauper children, who would be in the workhouse if not in this building, and they were in charge of officials appointed by the guardians.

After hearing the arguments the magistrate said that he felt bound to hold that this building was a workhouse or an extension of the workhouse. He therefore had to find that the building was a public one, and used as such without the consent of the district surveyor. He imposed a fine of 1*s.*, and refused costs, considering the question merely technical.

Building Occupied partly for Trade and partly as a Residence.

CARRITT *v.* GODSON.

This was a case stated by a Metropolitan magistrate which came before Mr. Justice Day and Mr. Justice Lawrance on the 5th June. The question was whether a public-house can be described as a building used in part for trade or manufacture and in part as a dwelling-house, so as to fall within the provisions of section 74, subsection 2, of the London Building Act 1894, as to separation of the portions in distinct use by structures composed of fire-resisting materials.

Mr. Avory appeared for the London County Council, and Mr. A. F. Wooten for the respondents. It was argued for the district surveyor that the building, being occupied partly as a dwelling-house and partly for the business of a licensed victualler, came within the section; and for the publican—(1) that the license applied to the whole of the premises, and made section 74 inapplicable; and (2) that there was a sufficient separate entrance to comply with the section. The facts and arguments are fully reported in *The Times* of the 6th June.

The Court upheld the magistrate's view.

Mr. Justice Day said that there was great difficulty in applying the section to a building of this description. The only matter in which it came within the section was because it was of the requisite size. He could not see that this was "a building used in part for purposes of trade and manufacture and in part as a dwelling-house." A publican carried on his business all through the licensed premises. They were all used in some sort for the entertainment of guests. In addition, there was in this building a staircase leading to an open yard. That staircase was made of fire-resisting material. It was true that the ordinary and more pleasant approach was through the bar; but this yard was an open space which, so far as could be seen, could contain all the inhabitants of the house in safety. At any rate, the learned magistrate's decision must be upheld unless the Court were satisfied that he was wrong. He did not see any sufficient reason for interfering with his construction of the section.

Mr. Justice Lawrance concurred. The section in question did not apply to a case of a public-house such as this. It applied to the more ordinary case of a shop with living-rooms over it. He thought that the magistrate's decision was correct on that point, and it was not necessary to go beyond that. He would not say anything about the approach from the yard, though some advantages might be obtained in case of fire by getting into the yard. He did not approve of the system of indirectly forcing people to make separate entrances to their dwelling-houses when the Act did not expressly make provision for it.

ON THE USE AND VALUE OF COLOUR IN ARCHITECTURE.

BEING THE ESSAY AWARDED THE INSTITUTE SILVER MEDAL 1899.

By Hubert C. Corlette [*A.*],

OWEN JONES STUDENT 1896; INST. ESSAY MEDALLIST 1899.

Illustrated with Photographic Reproductions of Drawings by the Author.

PART I.

INTRODUCTORY.—As the scope permitted to an essay does not allow too much notice of details, but rather, as the form prescribes, is limited to a general consideration of the subject of which it treats, it must of necessity deal more with a statement of leading principles, combined with a short historical review of the matter proposed, than with a close inquiry into the details of methods employed in practice. Such matters have been ably dealt with in many treatises, which it would be gratuitous to epitomise when they may so easily be consulted by those who would know more of those affairs upon which this thesis may only briefly dwell. I shall merely, in certain cases, point to instances which archæology shows of the use of colour, and indicate what seems its value in works of architecture. No new theories concerning the use of colour shall be promulgated, for surely practice is the only safe guide and school, based upon observation of the principles discoverable in the works of nature and the experiments of our predecessors in art. The value of colour may not be intrinsically gauged, but it likewise cannot be over-estimated if we regard it as an educative power, an uplifting agent, or a satisfying and pleasing accompaniment in the necessary things of life. For colour, though it has primarily been used by man to supply a want, a real craving in his nature, while it satisfies that demand, gives pleasure to his senses, and arouses aspirations in his being. And when it suggests thoughts to his mind, it leads him on from the consideration of its material existence to a contemplation of its relation to the physical world about him, its influence over him by its simple beauty, its æsthetic power, or the theme it tells. From these he passes on to seek for an interpretation of the spiritual things it may signify.

The present century, though it has witnessed many revivals, has seen some new developments, not alone in the arts, but in literature, in physical science, in speculative and natural philosophy, political and social aims, as well as in those things of faith which are the foundation, and should be the springs, of all human thought and action. Research in every direction began strenuously to inquire into, and carefully to sift, the forthcoming evidence which could tell of origins and elements. Revival had been caused by preceding decay and consequent revolution. Desire for reformation followed, meeting further revolution in its course. In their quest many found that restoration was the first thing necessary before onward steps could safely be taken. And by this—though some certainly desired it in another sense—was intended a return to first principles, and a shaking of the recesses of our minds free from the accumulated traditions, which had so much clothed, and hidden, sincerity of purpose and truth of method. And though these may not have been the leading motives of all who searched, yet, in the main, those were the objects and desires which moved men, generally, to act.

Among these movements was one that prompted to a study of the past, in the hope of deriving from such a course a better capacity to understand the present and to gauge the probabilities which the future held in its obscurity, so that the best direction should be given to all effort. Another was induced by a natural wish to obtain a better and deeper understanding of the forces of nature, so that they should be more readily commanded for service. There were others not germane to our present purpose. With the former of these two aspects of the one movement arose the science of archæology and the study of the history of the arts generally and particularly. The object of this endeavour was to discover the part which art had played in the great schools of thought in the past, to show its relation to and influence upon our race, and the different methods which had been pursued, while they were practised, at different periods of time. The latter, in its bearing upon our subject, developed the processes of analysis applied to the phenomena and laws of nature, as an aid to show us the secrets of physical structure and the hidden properties of the material elements. In the study of results, men sought a cause and found a law, and thence deduced principles upon which might be surely founded true science and consistent art. But they found that synthetic methods, applying discovered law, could not educe the same effects as the hidden primal Cause, whether the attempt was made in science or in art. Development, evolution, was a fact whose arrest meant sure decline. And in order to avoid this fate we need accept the principle, and seek to understand the purpose, under the guidance of which all things move onward to their final manifestation in the beauty of true perfection. The principles and facts of evolution in both these fields we needs must accept, even though we may deny the truth of those theories which would substitute a material for a spiritual cause in all we see. The first aspect to which we have referred attacked the moral and mental view of things, seeking to find their relation to the spiritual; the second studied the physical in an endeavour to apprehend the supernatural. With both of these it will be necessary to deal in the course of this essay.

Napoleon, though his relation to the moral side of some questions may seem remote, was an agent and an effective instrument when he instituted inquiry by his deputies into the hidden lore of that now partially unveiled land which was once the granary of the ancient world, and whose art is the parent of all other which, since its rise and fall, has been developed in the West. Egypt discovered the use of the arts by herself, unaided, it would appear, and initiated principles for their practice and methods for their application which have been but little departed from since her time, for they may still easily be discovered in the designs put forth to-day, and in the motives which have prevailed through a course of some four thousand years. Since the days of the first Napoleon Egyptology has become a distinct branch of scientific archæology. Its study is of great value as an aid to show the foundations from which art has risen, and upon which she has often fallen in her desire to return to first principles.

But let it be said at once that we should look to the examples of the past as instances of experience for the schooling of the present—distinctly not for specimens to be catalogued as motives for universal adoption, but for ideas which shall be as seeds to germinate in the garden of our imaginations, root themselves in thought, and rise matured as lovely plants ready to put forth a perfect expression of their best selves in flowers of richest colouring. We must for ever despise that custom which goes to any phase of art's many schools and clips here a leaf, and there a flower, or strenuously upholding stem; brings these home to the marts where incapacity resorts in order to seek all things which have been collected, and there cabined and confined, so that they may be ultimately cribbed. There had been a futile attempt to 'revive' the so-called 'classic' forms of Greek and Roman art during the eighteenth century, when revolution seemed Europe's only resort. Then some plunged into the Middle Ages again, and hoped to restore safe traditions and lost ideals by a return to times and conditions alien to their own.

UNITY AND TRADITION.—Let us now take up the thread of tradition as early as we may, and follow its course through history. And in doing so it will be necessary to use the evidence which archæology affords, as our help, in an endeavour to discover some true principles for guidance in art.

In Egypt the earliest monuments provide examples of the best work which that extraordinary phase of civilisation produced. The inhabitants of the Nile basin were masters, in their time, of the use of those principles in art which prevailed so generally before the Christian era. And by their efforts examples were produced which have proved, if not the actual school for the later arts of the West, at least the original foundation from which those schools have risen. From the ascribed date of the earliest monuments to the latest structures produced under the Ptolemaic and Roman supremacies there is a continuity of tradition which, though in some respects it does not represent development, shows the intimate relation which existed, and must always exist, between the artistic products of one era and another. For the human family is one, though its characteristics vary so widely when it is subject to different conditions, whether of sub-divisions in the race, climatic influences, or the principles of religious faith or political belief, under which these peculiarities have been developed. And this unity is manifested, not only in the physical structure and form of the individual, but also in the essential elements of his being, which art in her own province must express.

This oneness is further shown in art, which, though it is so diversely expressed, indicates, by the language it has used in the past, that there is and can be no division of the human family in its ultimate origins. This the science of archæology is able to tell us conclusively. These statements will, it is hoped, be sufficiently upheld by what follows in considering one aspect only of art in its relation to and its influence upon man.

GENERAL PRINCIPLES.—Now it would appear, from what history and archæology teach concerning the customs of those builders and designers who have preceded us, that the use of colour in its relation to architecture may be grouped under two leading propositions.

The first is, that colour may be introduced in buildings by using such materials for the essential structure as have in themselves the colour required for decorating these as works of architecture. This may be called structural decoration.

The second is, that to buildings which have, or have not, been decorated by coloured materials used constructively, coloured or other decoration may be applied. This may be termed decorated construction.

Such a classification as structural and applied decoration is obvious, and may need no further demonstration; but, as truisms are often misapprehended, it may be well to explain what is in this case intended by the terms used.

There is a much-used aphorism which says, "decorate construction, never construct decoration." Now the value of any form of antithesis depends not alone upon terseness and an apparent felicity of expression. Its merit is but partial when, as in this case, there is a risk of misinterpretation.

Since the principles to be discovered in nature should ever be the foundation of all practice in art, let us see what happens there to support what is more true—that we should, in building, decorate construction if we would have it architecture. And, having done, or in doing this, we may further upon the fabric construct a scheme of decoration. It will, however, in the course of this essay be necessary always to refer primarily to the use of colour as a means of decoration, and to sculpture, carving, and other methods only as they affect the main subject.

"Construction" implies design, and "decoration" cannot be without design. A disordered chaos either of them may be if you will, a product of human misconception. Law—that is, design—rules among the elements of nature, but so-called art, which in its being shows no sign of artifice, is anarchy, and never can be beautiful. Does a plant not grow according to some ordered scheme? Does it not, when by the secret force of life its structure rises from the hidden seed, become clothed with colour which is an integral part of its still growing frame? The bark of any tree shows that this is true. The very vessels which carry the living sap up to its nostril-leaves occupy the place designed for them, perform the functions allotted them, and are beautiful in colour and in form. The nourishment these nostrils gather colours them, and, while they help to complete the building begun below, they give it sustenance and life, so that the more lovely flowers may come to brighten in the sun, and form new seed to carry on their life.

Is there no decoration in the structure of a leaf? Is there no structure in the decoration of a flower? Undeniably there is. The very colour of each thing has structure and design within itself, however large it be, however small.

But it is necessary to observe that the decoration, the beautifying of things in nature, does not stand first in order, but depends upon, and is the outcome of, perfect structure. It is, at the same time, not supplementary, as is sometimes supposed in works of art, but complementary to that of which it is the final flower, the signal embellishment. The figured material symbol speaks by its silent loveliness high themes which, alone, the stem could never tell.

In visible art, as apparent in nature, all things are material, but these should be used as aids to our apprehension of the mental and spiritual. The means by which one is expressed and the other lives and acts are physical; but one is, and the other should be, ultimately designed for the interpretation of the attributes of God and man as they may be discovered in the works of each. And as nature is the visible evidence of the acting mind of the Creator, so art, based upon this, should be a sign of the working mind of man endeavouring to express his ideal aspirations. For design in art is a creation of the creature, born of that design in nature which is a manifestation of the Creator.

Structure and decoration both involve design—that is, construction, artifice, device. The latter follows the former; it is an integral part of it, and in its highest aspects may be the means of interpreting the deeper significance of every material form, every created symbol.

"Mere decoration!" some have said, as if in sufferance of an unessential thing. "Mere" decoration! Yes, if the so-called decoration is no ornament to the thing it clothes. But the phrase is too often a resort in which utilitarian dulness takes refuge as a convenient sanctuary. Does not decoration in the works of nature place the seal of His perfection upon all the Creator's deeds? Each stage of building He completes as He proceeds, and by that stage provides the means which shall sustain the others which ensue. The seed, the germ, the one foundation of a plant, the material holder of the elements upon which the mystery of life may act, by the processes of nature, or, by the effort of directed human thought in the designs of art—this for its purpose is complete. And so it is with the stem, the branch, the twig, the leaf. Each is conceived, designed, with truth, built with beauty; and upon these all the stamp, the sign of loveliness, is set when every bud has blossomed into flower.

The parallel between the principles in nature and those which should rule in the processes of art is surely obvious, and needs no further exposition to state the importance of the place it should occupy in our minds. Once seen and once accepted it forms the surest base from which we may deduce sound principles to guide us in design.

Egypt.—To Egypt we must necessarily always refer in any attempt to review the growth and progress of decorative, or any other branch of art. The architecture which her extraordinary civilisation produced has long been the acknowledged origin of that which has followed since her fall; and our present aim is to see what use, in that architecture, she made of colour. This will show its value in her regard.

We are familiar with the Nile valley and its inhabitants primarily from the constant reference to them in the records of the Old and New Testament Scriptures. But to understand something of their use of colour in architecture, and the high esteem in which it was held by them in all their decorative art, it is advisable for us to know a little of those customs which helped to produce the nation. These were fully set forth upon the monuments they have left behind, being evidences not only of their skill as engineers, builders, designers, but as representative of their religious aspirations, their political system, and their private social habits.

However, the recapitulation of what history has to say upon such topics is beyond the scope of this essay. At the same time, it may be well to observe that religious faith and political ideas have obviously at all times been important factors in determining the characteristics of a nation's artistic productions. This was not more particularly so with the Egyptians than other races. But with them these guiding powers had great influence. The best works of art in all ages are those which have been raised by man in honour, or in fear, of the deity or deities it was his custom to worship or his privilege to know. Most of the pre-Christian forms of faith were polytheistic, the most notable exception being, of course, that found in the Jewish nation. And this faith, whatever its kind, was represented by the arts so long as its vitality lasted and its votaries were sincere.

The intimate relation that existed between the rulers of Egypt and the priesthood, the highest caste among their subjects, indicates a cause for the erection of so many tombs and temples, whose structure must always be a subject of wonder, and their decoration one of surprise. It was no doubt part of the national policy to support and protect the faith of the people, and to guide it as was thought best, for the king's council of advisers was composed of the most learned amongst the priests. It was their belief that without religion no state could stand, and that, if one was lost and the other survived, it would be far better for man if that which upheld his faith remained; for, said they, religion without the state may stand, but the latter without the former must ultimately fail. This, no doubt, is the reason why we find buildings, most wonderfully decorated, raised in different parts of the land, to one or other of the very numerous gods whom they recognised. It was upon these edifices of all kinds that they, with the hieroglyphic characters, inscribed their history and confessed their faith, indicated their accurate powers of observation, and recorded, by the examples they left, the fact that they were perfect masters of the art of conventional design, and the use of colour as an integral part of any architectural product. But their use of colour was not the mere satisfaction of an æsthetic fancy only. It was used to complete their work so as to render the symbols of their language and faith more intelligible; to emphasise the facts which were to be read and understood by those who gazed at the things representing the story of their military expeditions and domestic customs. The prevailing spirit apparent in all Egyptian art is one of grandeur and magnificence, an evidence of the mightiness of force, a signal of tremendous power, calculated to impress and satisfy the sensuous nature of those who caused its being.

It is perhaps unnecessary to remark that the works of architecture were large in conception, bold in execution, and broad in all their treatment. The execution of detail was left to the inscribers, who covered every wall, every cornice, every column and ceiling, architrave and cap, floor and dado, with a rich profusion of varicoloured signs. There were those decipherable as language, all carefully disposed with a strict regard to the decorative result, in their appearance as one whole scheme, when they should be completed. Others pictured the deeds of war and the arts and habits of peace. But further, there were those which, as symbols, revealed by sign the mysteries of their faith. And these all were coloured, for the Egyptian painted everything.

The positions in which colour was used by them were chosen with but little regard for the effect that climate might have upon their pigments, whether internally or externally applied, as the media used were of a nature so durable that the place they occupied mattered little. And when they used coloured material structurally, they were still less influenced by the same matter, which, in more northern climes, becomes an important and ruling factor in the processes of the arts.

With regard to their use of coloured material in decoration as a necessary part of the physical structure, we have not seen much evidence of their having developed this method to any finished degree. This is perhaps little to be wondered at, since the principle upon which their ornamentation was based was, so largely, that of application. And the fact that the use of such decoration to them was first, no doubt, to convey some definite and intelligible impression, doubtless became the origin of such a system. But it is well known that they, like most peoples, primitive or civilised, used sometimes a purely conventional, unrepresentative, and geometric form as a basis of design. Further, there were other elements upon which their decoration was based, and these were derived from nature for use in art either as forms solely decorative, or as a means of representing a connected theme which expressed a single ruling idea. Nature they did not copy; but they did study the methods, the principles of law which, in the works of nature, were visible on every hand. And, again, like all arts which have ever attempted to express the spiritual and ideal conceptions of mankind, they called in the facts, the forms and characteristics, of natural life, to state by symbol what they apprehended of things spiritual and could not sufficiently describe by other means.

The use by the Egyptians of geometric combinations in colour, line, and form, has left its impress on all succeeding arts. In the art of Egypt the use and value of colour in architecture is apparent in every direction. The great masses of the temple or other buildings were covered with applied colour. This decoration was nearly always symbolic in the main, though it is of course not necessary to find a hidden sign in every isolated band of plain or chequered lines. These were used as a means to bind the several parts of a composition into one whole. And whether they were mere lines laid together with a harmonious relation of varied colour, or treated as contrasting tones, shades, and hues, they were always arranged with much care, and a regard for the general decorative effect. Nevertheless, some of these composite borders in colour have told tales of their own origin and their evident connection with later carved and painted forms, to those who have carefully investigated their characteristics, and compared these with other objects discovered by archæology. A desire to adorn himself, and in some way to decorate all objects associated with his everyday life, seems to have been an inborn characteristic of primitive man; and where instinct and observation were his chief, if not his only guide, man has, with a native simplicity, always contrived ingeniously, and often beautifully, to exercise his growing skill in the arts. Though scratches with flints and daubings with coloured muds, or burning out, may have been an early means to satisfy his craving to create, to form, to make, to design, to realise the conceptions of his imagination by the aid of his mind guiding his heart and hand, he was not long confined to such primitive usages.

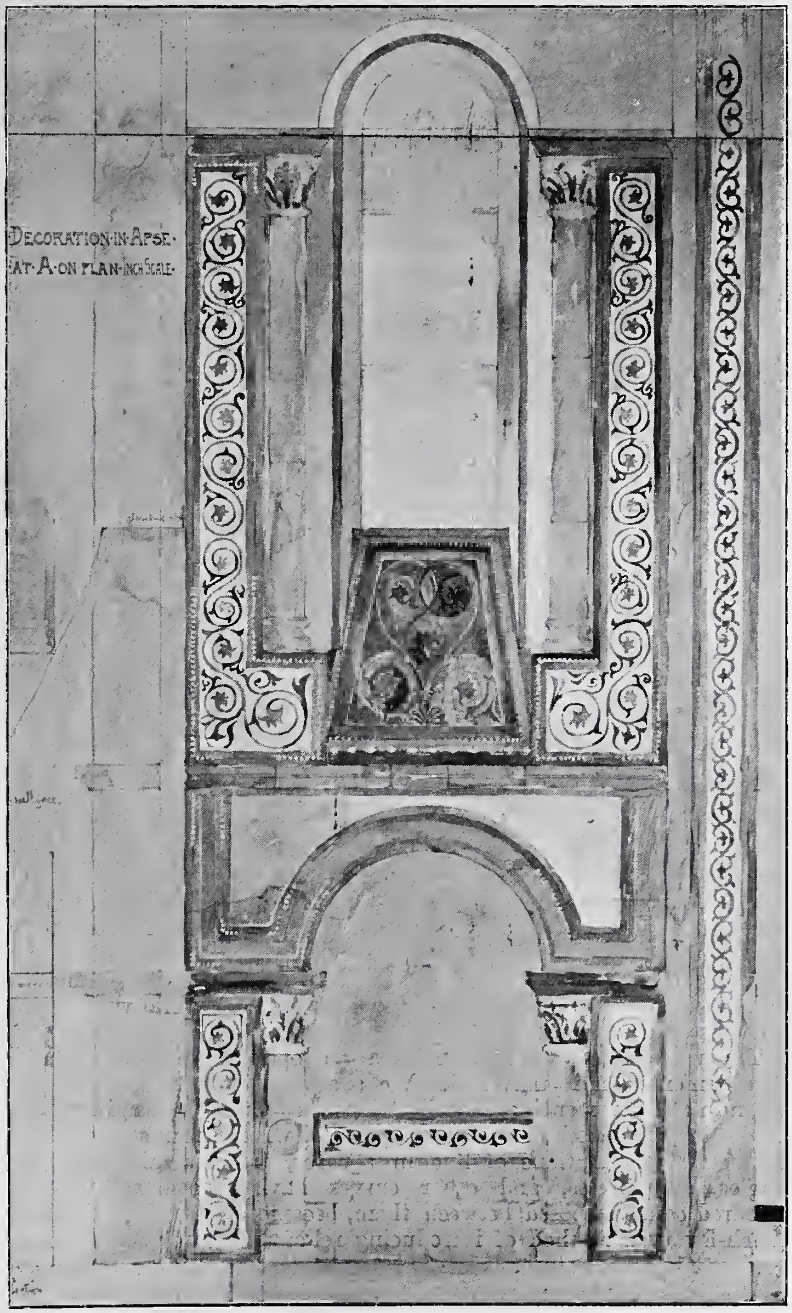

FIG. 1.—Wall Decoration, 12th century. Painted on plaster over stone. The Abbey Church of S. Savin, near Poitiers.

But prehistoric man, though exceedingly interesting to the lover of specimens, concerns us little here. We find some of the earliest historic monuments in the works which Egyptology has discovered, and these all tell us that their builders were pre-eminently a body of decorators, and that the decorations they used were always carefully designed and treated with colour, the oldest examples being invariably the best that have been found. The Egyptian used his hieroglyphic inscriptions, his writing, which was pictorial and symbolic in itself, as a decoration. He cut it all over his buildings, and filled the incisions with coloured matter. But he subjected this to an ordered scheme of design, and made these signs serve the purpose of a dado, a capping band, or a frieze, while they also told a tale of conquest or commemorated some mystic ceremonial. With this written story he mingled great scenes of peace or war chiselled in the stone or granite face of pylon, temple, and tomb, and brilliantly coloured them. He used colour as an aid to tell his history, to vindicate his rights, to express his faith, with its great vain hopes and superstitious fears. He pictured his religious rites in colour upon his walls, he showed all men that his gods were beasts and birds, that he worshipped animalism and revelled in the satisfaction of sense, especially when he debased his art and dishonoured himself by representing the hideous orgies of some drunken festival. Such was the Egyptian's use of colour, and so did he value it, deeming it essential to the fit and proper representation of all he desired to tell of life as he knew, or supposed he knew it past, present, and to come. By his art he tells us he believed, like ourselves, in resurrection and a future life; though by the same means he tells us that tradition, estranged from true sources of revelation, led him, as it has others, to false deductions, and speculative misrepresentations of these deep truths.

The elements of Egyptian decorative art—colour being always understood as never absent—were generally derived from three or four sources, from geometric forms, from nature, from structure, from the uses of symbolism. The line was used either as a simple and elementary border or in combinations, such as were derived from the zigzag, which developed into innumerable varieties of design. In later times, the same element became the waved line, and so provided still other schemes of combination.

This use of the line as an article for adoption in ornamentation is universal. We shall see it again in the pavements and wall patterns of the Byzantine, Saracenic, and Gothic periods, when geometric combinations of line in squares, triangles, and circles, and other curves having coloured bands disposed between them, became a much-favoured method of introducing relief and variety into architecture.

The spiral was another form which, like the scroll, has been, and still is, the foundation of so much decorative art, whether carved or in colour. So much, indeed, that appeared among the Egyptians as painted work applied to a hard material was carved out of that material by later schools, and the ground upon which the carving stood was often coloured. The cut work itself was sometimes also coloured, but frequently left as from the chisel alone, or else touched only in its leading lines with gilding and a little colour, allowing some of the native material to be seen as well. The painted spiral is always pointed to as the original of the painted and cut fret of Greek and later times. The line was used in the way already indicated, as the monuments themselves, or any of the numerous treatises dealing with their peculiarities, show. It was made also to form a boundary confining a set of hieroglyphs or as a band upon the columns at the base, neck, or cap. Large surfaces of wall having either inscriptions alone, or with figure subjects upon them also, were broken into panel forms by banded groups of lines of red, blue, yellow, green, white, and black in different combinations. The lines or borders were either simple flat colours laid side by side; or else, a dado band or cornice used as a horizontal division, was a flat ground of one colour upon which other decoration was superposed with or without edgings to separate the applied design from the ground it covered.

Beside the plain straight unvaried line, and its early development the zigzag, there were other customary ways of using geometric form in decoration by colour. The most important is, perhaps, that which introduced the spiral. This idea has, since the earliest times, been the foundation, the principle of structure upon which some of the finest designs have been made. The Egyptians themselves developed it when once it came into favour, and added to the simple spiral line, or spiral bounding lines within which colour was introduced, the various natural forms they were accustomed to use, such as the palm, the papyrus, and the lotus. The form was generally used in Egypt as a decoration painted upon a level surface, and was much adopted as a ceiling pattern.

With the spiral, fret, zigzag, and waving line the simple spot of different forms and colours was often introduced. Where the continuous or other spiral was not chosen, a simpler pattern of diapers or chequers was adopted. It was derived apparently from the patterns made by plaited or woven objects, such as basket-work of straw or reeds.

Hangings and dress fabrics suggested other forms derived from needlework. And though it is said that the Egyptians did not resort to the compass they certainly used the circle, worked, no doubt, from a centre with a string. It is peculiar that, as archæologists tell us, the art of Egypt never took as a motive the regular hexagonal form, with its consequent equilateral triangle, so easily derived from the circle; a common type in Assyrian decoration.

To nature the Egyptians went direct for their best ideas in design. This was the fount from which they derived their highest inspirations, and it was in the forms of nature that they found the symbols by which alone they could signify the

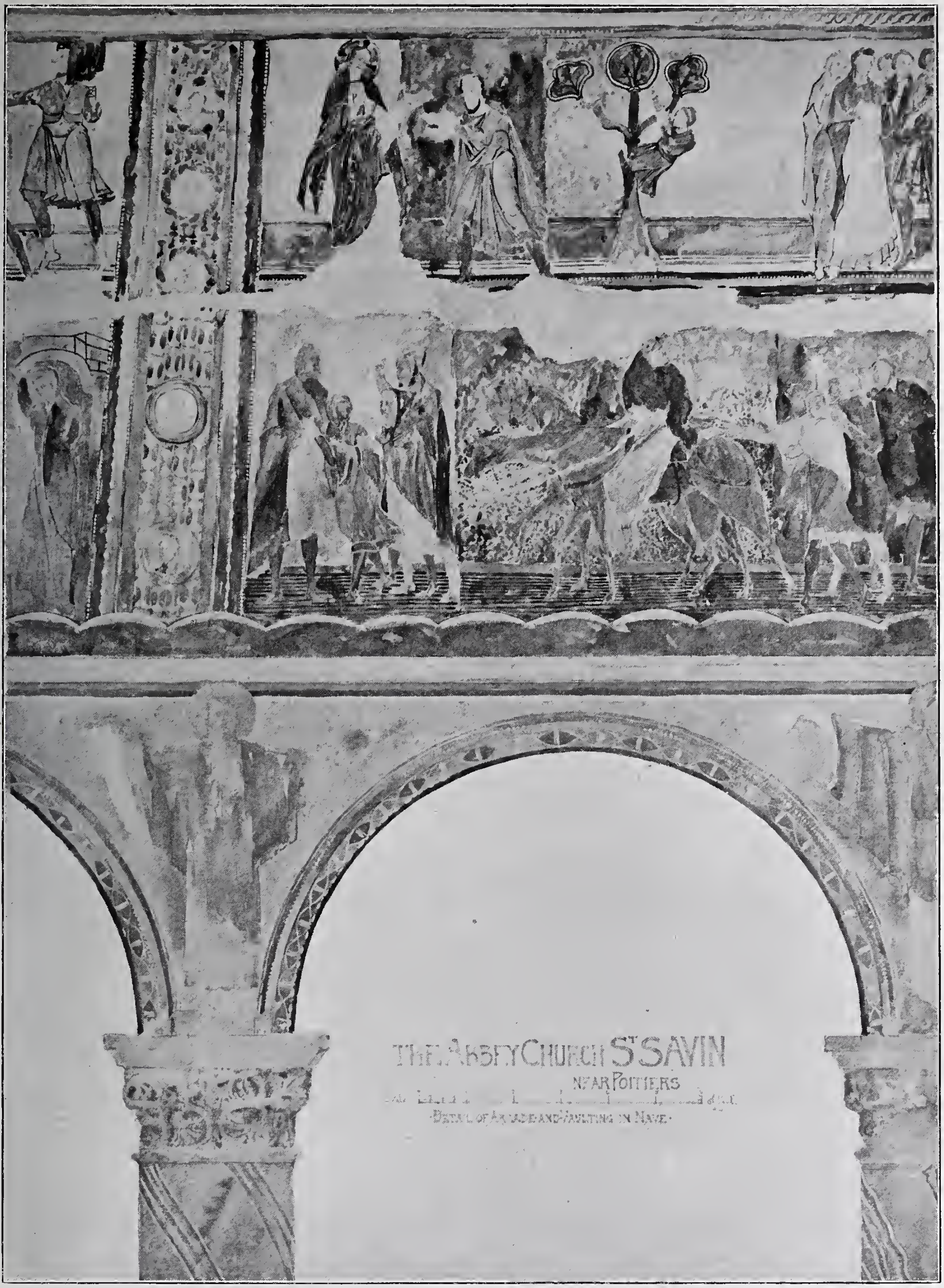
THE ABBEY CHURCH ST SAVIN
NEAR POITIERS
DETAIL OF ARCADE AND VAULTING IN NAVE

FIG. 2.—Painted Decoration, 12th century. On plaster over stone. Detail of the arcade and barrel vault of the nave. The Abbey Church of S. Savin, near Poitiers.

mysteries of the supernatural. They adopted, as a motive for ornament, the simple things with which their observant minds were familiar. The human figure was used everywhere. Their way of dealing with it was certainly most conventional, sometimes arbitrary, but always decorative. They made it large if it was to be the impressive and leading feature in a scheme of descriptive ornamentation; if insignificant, they made it so by its relation to, and its comparison with, figures or other objects. The human form was always in the earliest examples admirably though decoratively drawn. The line of incision or relief always grasped the characteristic forms and the related proportions of parts to the whole body, which was invariably shown in profile, with the eye as if seen in the full face. The work was always vigorous, full of living action, and seldom dull, though to our eyes it is rather archaic. The Egyptian methods of introducing the figure in decoration are useful to those who study them, as they well serve to indicate how much may be told in ornament by simple means. These decorations told their own tale simply, emphatically, and directly. The theme presented was always clearly shown, though to understand the thought, the mind discoverable in the ornament, the onlooker was expected to use his own capacities and think, observe, or recollect. If it was no definite subject that was to be seen, but only some pleasing combinations of colour and form of line, the satisfaction conveyed was one which gave pleasure more to the senses than to the mind. And it was to these that all the art of Egypt most directly appealed, whether it was architecture, painting, sculpture, or the related handicrafts. It pleased the physical ambitions in them, because it manifested their own power over inanimate things. It impressed them with the littleness of themselves who made these things, and yet with their own greatness who could offer such works to their deities, whose powers were still mightier than their own. Deity was to them chiefly the mastership of the physical laws of the material world, which they used thus in its honour. But though their art most directly appealed to the senses, it claimed also the attention of their minds, and so awoke intelligence and aroused new thought. It pleased them first, taught them next, and finally uplifted them according to its power and their response to its appeal.

These Egyptians, the fathers of an original development in the arts, like the mediævalists, did not confine themselves to a few simple conventional forms originally, perhaps, derived from nature. They made their own translations from the natural originals, and so were able to interpret them in a language of expression in art which was characteristically their own. The more important motives were derived from some dozen different objects.

The lotus plant and flower, in all stages of its growth suggested, by itself, innumerable schemes of design in line, form, and colour. In decorative painting nothing of importance was done without it. And the familiar anthemion of Greek work is supposed to have been derived from certain early representations of the lotus. Archæology teaches that the suggestions which Hellenic art took from that of Egypt were derived first from surface-painted and incised decoration, and that this decoration was, by the later Greek school, carved in relief and so painted.

The papyrus, like the lotus, also suggested motives for cut and painted work, and as well the palm, the vine and its fruit, the thistle, and convolvulus. Since among birds the ibex was so reverenced, it was natural that in them suggestions for conventional decoration should be found. Birds, beasts, and fishes, variously coloured, frequently appear in Egyptian art as symbols or as parts of some descriptive or didactic representation. The feathers of birds—and the whole wing, as we shall see when the symbolic idea is considered—played a great part in giving thoughts to these designers.

The simple disposition of the feather upon the living bird, quite apart from the indication of possible colour treatments it may have conveyed, provided many ideas for patterns. Designs derived from feathers were painted on wooden or stone columns, and with slight carving they were used in the coloured decoration of some capitals.

To the Egyptians the jewel stars, whose radiating points of gold like arms of light fingered the blue vault of heaven, gave many suggestions. One, of which they made much use, was that of painting their ceilings like the heavens that covered them. But when they did so they put the glimmering five-pointed stars upon the blue of an evening sky, not upon the lighter tint seen by the burning sun's hot rays. It was the softened blue displayed by the risen moon that they preferred. A certain idea of consistency prevailed, no doubt, in guiding them in their selection. A desire for comfort and release from the out-door glare prescribed a deep blue field as being not only pleasant, from the associations which thought would suggest, but also, because the colour blue is cool. It is more allied to grey and black than the other primaries, red and yellow.

Structural decoration in colour, of the kind we understand by such a term, was, apparently, not frequently practised by the Egyptians as a definite branch of architecture. They used coloured, glazed, and decorated brickwork, but not to the same extent as the peoples of the Assyrian and Babylonian era, whose work we shall briefly consider presently. But they derived much matter for application in decoration from the suggestions conveyed to them by the structural forms both in nature and the primitive methods of building in

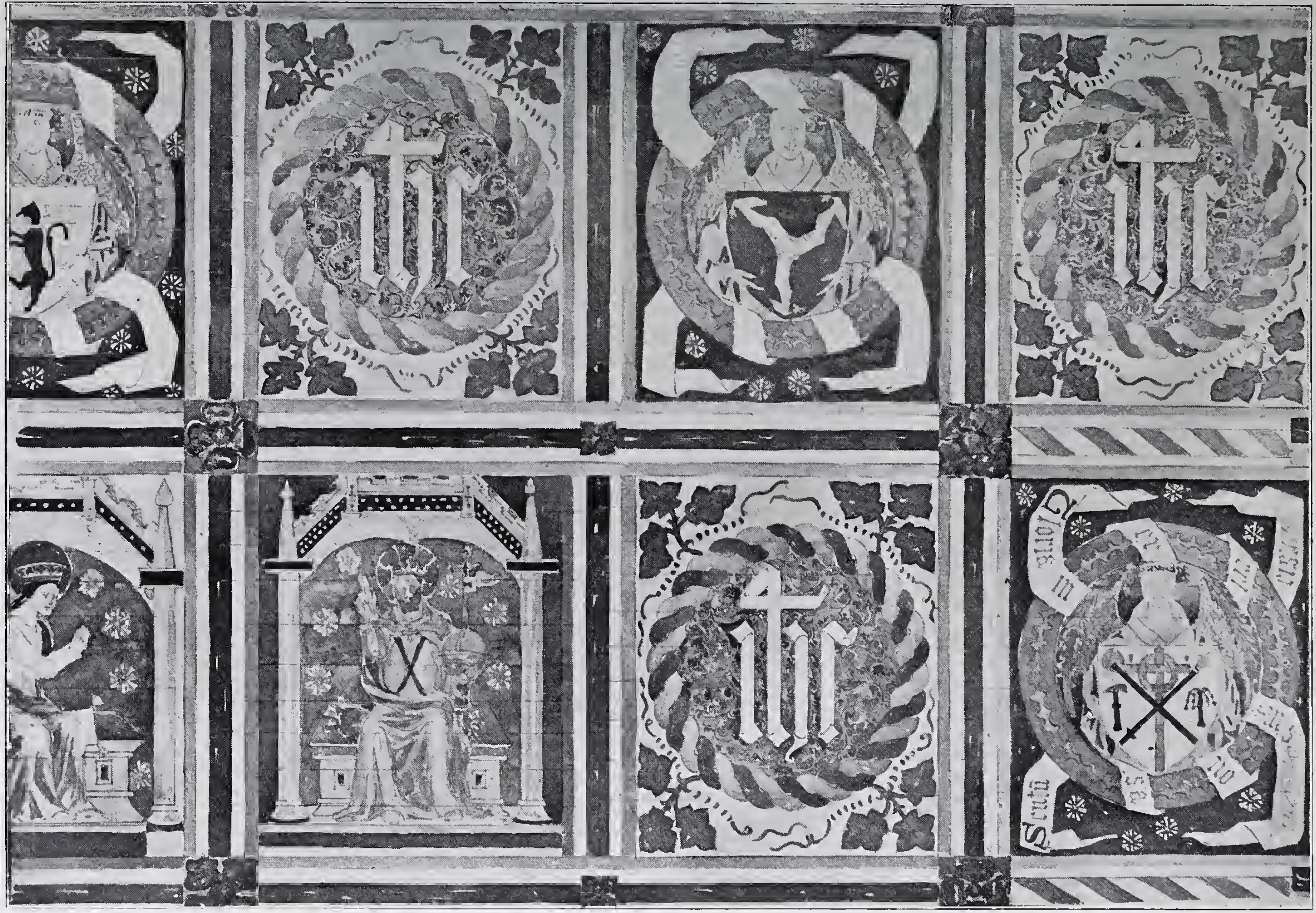

Fig. 3.—Decoration painted on wood, late 14th century. From the flat ceiling of the choir, St. Alban's Abbey.

wood and stone. As is well known, the lintel, and cross-beams resting on it, are supposed to suggest the origin of some motives in Egyptian and Greek ornament. And no doubt there is much truth in the surmise. However this may have been, we know that framing in wood was by them translated into stone forms and painted. This was decoration suggested by forms of structure, but it was not structural decoration in our sense of the term. Panelling in brickwork, glazed or plain, was used in Egypt as in Babylonia.

Everything in Egyptian art was in some way coloured, as part of a scheme of polychromatic decoration. And they painted not merely the chief features of their building construction, but often represented upon these features the sources from which, apparently, they themselves were originally borrowed. Columns, caps, bases, cornices, doorways, the great lintels and the panelling these made as they passed from cap to cap to form the flat ceilings—all were brilliantly coloured. And this colouring was not dull and of low tones. Throughout all their work they used the primaries red, yellow, and blue profusely. White and black were used to outline a design to separate colour from colour, and to emphasise the different parts. And the tones of these primaries, in the best period of their art, most nearly approached those of the prism. Lighter or darker tones were adopted as they wished in different stations, but brightness of colour was the rule, not the exception. Had lighter hues been used they would have been almost invisible in the strong light of a tropic sun, and also would not have been so long proof against the sun's destroying power over applied colour. Lower tones were probably discarded because they would be so obviously out of scale with the familiar brilliance of the usual outdoor scenes. It was an unwritten law of harmony which led them instinctively to adopt those colours most suited to their geographical position, and most satisfying to their own nature, passionate and intense as it was.

Whether it was the custom of the Egyptians to use colour itself, irrespective of the things it represented, as a symbolic means of conveying ideas, is not decidedly known. But that they used symbols derived from the forms supplied by the phenomena of nature is certain. There is probably not one monument they ever built which does not carry a statement, or a confession of faith, quite irrespective of the hieroglyphic system and other conventional representations of incidents of their history, domestic, civil, or religious. And it was by these particular signs that they expressed their faith in things unseen. It would be interesting to know whether, in painting these symbols, they used any regular system of colouring. If they did, it might be possible to deduce the meaning, if there was one, which they attached to colour itself as a symbol.

As all language is an expression of mind by the use of symbol, so the presence of symbol should ever be a sign of thought. Words, the symbols adopted by man in speech to state his personality, are perhaps sometimes used by those who have but little understanding of their significance. There are, however, many signs that voice the thoughts of man in art which are enigmas now to many of us. They have become pretty motives of unmeaning ornament, to those who have culled them from the dictionary of present traditions and past experience. When the Egyptian wished to express a volume of thought by one mere sign he used the accepted symbols of his faith, knowing, as he did so, what was the import of the sign. And these, quite apart from the written hieroglyphs and the scenic representations on the monuments, were to be seen on every hand as primal motives in any decorative scheme in colour. We shall see that Christian art, far more than that of Greece and Rome, practised the same method to teach finer ideals by media much more beautiful.

Except in the smaller buildings, where it has been applied often for decorative purposes alone, design in colour has been used, always in periods of high artistic development, as a means of speech by symbol. In the uræus the Egyptian saw death as a power of royalty. This rested with his king, and so, where the cause of justice was, there was the sign. It was used as a decoration round columns, as a motive on cornices and in other positions. Other symbols, such as the uræus and globe, and these with two wings, the scarab a symbol of creation, the vulture, the lion, were the chief ones they used. The lion was a symbol of royalty and the power to rule. The bull Apis, the god most sacred of all their deities, was their chief protector, for it was by his kindness and care that they were preserved. In the vulture they saw a means of protection, and with open wings it figured overhead upon their ceilings.

Man, also, as one who possessed the attributes of deity, was represented in their scheme of coloured and carved symbol among the creatures they chose to deify. It was barely a compliment to their own faculties that he should be assigned a place in a hierarchy of gods with bulls, cats, and birds, as his associates. But this is no surprise, since their decoration alone is sufficient to show that animalism and the senses led their ideals. Nevertheless, many of these things, beautiful in themselves as conventional designs drawn from the resources supplied by the natural phenomena with which they were acquainted, were full also of a significant beauty of thought. And this was to be read in cut and painted forms wherever the eye might wander.

The use of colour, as well as the treatment of form, in the decorative work of Egypt was always conventional. Colour and form they found in nature. They took leading principles, essential features, and subjected them to the skill of their own designing power. What they coloured was always first well conceived and carefully drawn. And, as we have intimated, and now repeat, the decoration of architectural subjects applies with equal force to furniture, fabrics, and other accessories. These all were either painted or woven in bright colour. Perhaps the important points to be observed in Egyptian colour work are its invariable use of flat, and not shaded tints, applied to simple, well-delineated forms; and also that their palette was restricted to the primaries.

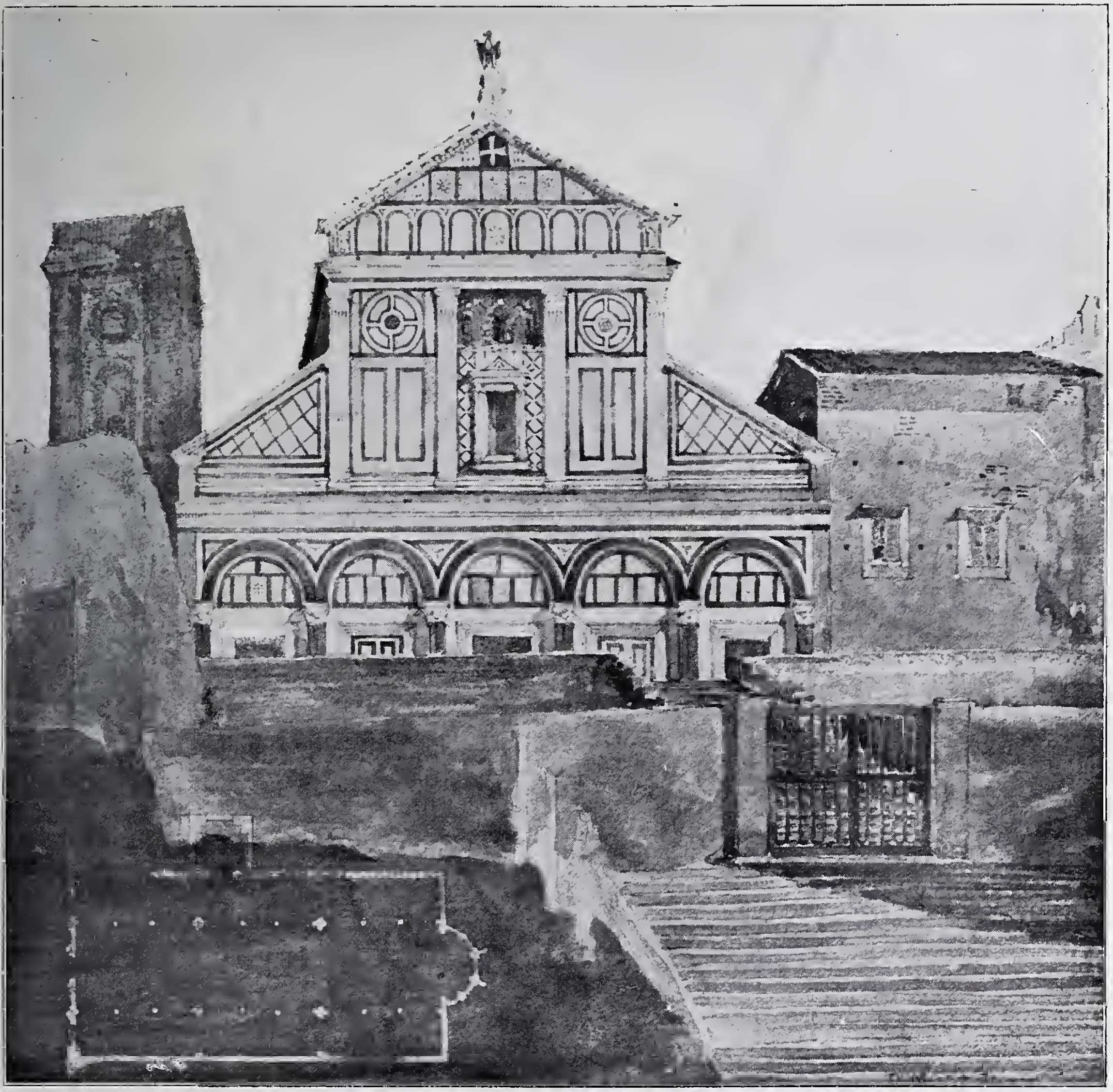

FIG. 4.—Structural and Applied Decoration, 12th century. In coloured marbles and mosaic. S. Miniato al Monte, Florence.

colours they used were few, being limited to varied tones, shades, and hues of red, yellow or gold, blue, white or silver, and black. White found much favour with them as a ground for applied colour. Purples and browns were not used in decoration until the later and Ptolemaic periods.

What has been stated concerning the colour

We have dwelt thus long upon the use in Egypt of design in colour, because it was an original and not a derived art, and further, because those leading principles which were with them the fundamental motives of all artistic expression were also, with few exceptions, those of the later nations who strove to express their thoughts and aims by similar means. It will therefore be unnecessary to restate these facts when we consider some other developments in the use of colour in architecture as the voice of humanity in art.

Building is the body which fulfils its purpose and highest use only when, as architecture, its mind and spirit speaks by the language of decoration in colour and in form. It then may tell the history of those whose refuge is within its sheltering walls, whose designs, revealed upon it, are able to show to us the heart of man as it has been expressed in the monuments he has raised for a public service to his Creator, for a civil encouragement of industry and patriotism, and for his private comfort and pleasure.

Babylonia, Assyria, and Persia.—In passing on now from our consideration of Egyptian colour decoration we meet three important Asiatic schools, those of Babylonia, Assyria, and Persia. With these, elements similar to those we found in Egypt had prevailed. Babylon, situated as it was upon the Euphrates, some three hundred miles south-east of Nineveh, had developed the brick-making industry and cultivated the use of glazed and coloured brickwork. This method of introducing colour into their architecture was a means of producing beautiful effects in a material able to withstand the wear of exposure if this were confined to the glazed surfaces alone. But associated as it was with other and weaker brick, time has resolved all their monuments to shapeless mounds, some to dust. Out of these heaps of magnificence collectors have unearthed many interesting and beautiful specimens of decorative skill.

Situate upon a plain far from any mountains from which marbles and stone might have come, the Babylonians were compelled to use the material accessible to them. Like the decorators of Egypt, Greece, and Rome, those of Babylonia had honoured their gods by the best offerings their arts could produce. Upon the walls of the palaces of Babylon figures of men and animals had been painted, or were represented by brickwork in coloured enamel or glaze. The colours they had used were a brilliant blue, red, and deep rich yellow, as well as white and black.

The relics discovered at Nineveh on the Tigris are representative of the use of colour by Assyria. Again the use of colour in architecture was to emphasise and add beauty to decorations which expressed the faith, policy, history, and habits of the nation. All their work was essentially conventional and decorative. Some motives were borrowed directly, no doubt, from Egyptian sources, thus indicating the political relations that had subsisted between these nations. But this influence was not so great as that exercised upon more purely Persian decoration, when Cambyses not only imported artists from Egypt, but allowed the symbols of Egyptian belief to be represented by these aliens upon the buildings of their conquerors. The Assyrians had painted, gilded, or silvered everything, and at Persepolis the same custom was followed. All things architectural had been delicately and carefully decorated with colours, especially in the interiors of the buildings.

Greece.—The intellect of Greece took up the course of art after it had fallen by Egypt's decay. Under Pericles she reached the summit of her capacity, and through the Alexandrian period followed to her decline, when Rome acquired the then accepted world, and bade the conquered nations minister to her conceits and serve her wants where her own skill could not avail.

Greece borrowed ideas from forms which had already been conventionalised by Egypt, Babylonia, and Assyria. Only in a few instances did she drink directly from the cup of nature's offering. But when she did she drank deeply, and made ideals, in her own field, of all her works. Her people, with their keener faculties of mind and higher perceptions of beauty in form and colour, took up the interpretations of nature's originals which they found then existing, and made perfect what they had found incomplete. And the cause of all her finer perceptions of proportion, form, and colour is to be found, no doubt, in the careful study of the human form and the keen appreciation of its beauties.

Greek architects used the colour with which their works were decorated, to emphasise leading features, and, to give a fuller expression to such details as they wished to display. And they did this not according to any arbitrary rules, as some would have us believe; they were not blind, unthinking slaves who followed custom because they were afraid of the troubles and responsibility that creative design imposed; but they did it with that freedom which they had acquired by the observation of nature's highest principles. These they accepted as their guide in art, whom they best served when they most obeyed those laws alone. Smaller minds than their own have attributed to them a theoretic system as the basis of all their power; but they, with all master-workers in the arts, expounded their theory by practice, and did not express all their practice solely by the coinage of logical propositions. Thus it is that we have examples still with us to show what they had done. To the Greeks, the Doric forms were not so severe as was once supposed. For we now know that they had been relieved from the austerity of all uncoloured things by the application of coloured decoration.

We are no longer troubled with the once exciting question which disturbed the prejudice, and what there was of imagination, in the minds of archæologists early in this century. In addition to the written evidences of those, like Pausanias,

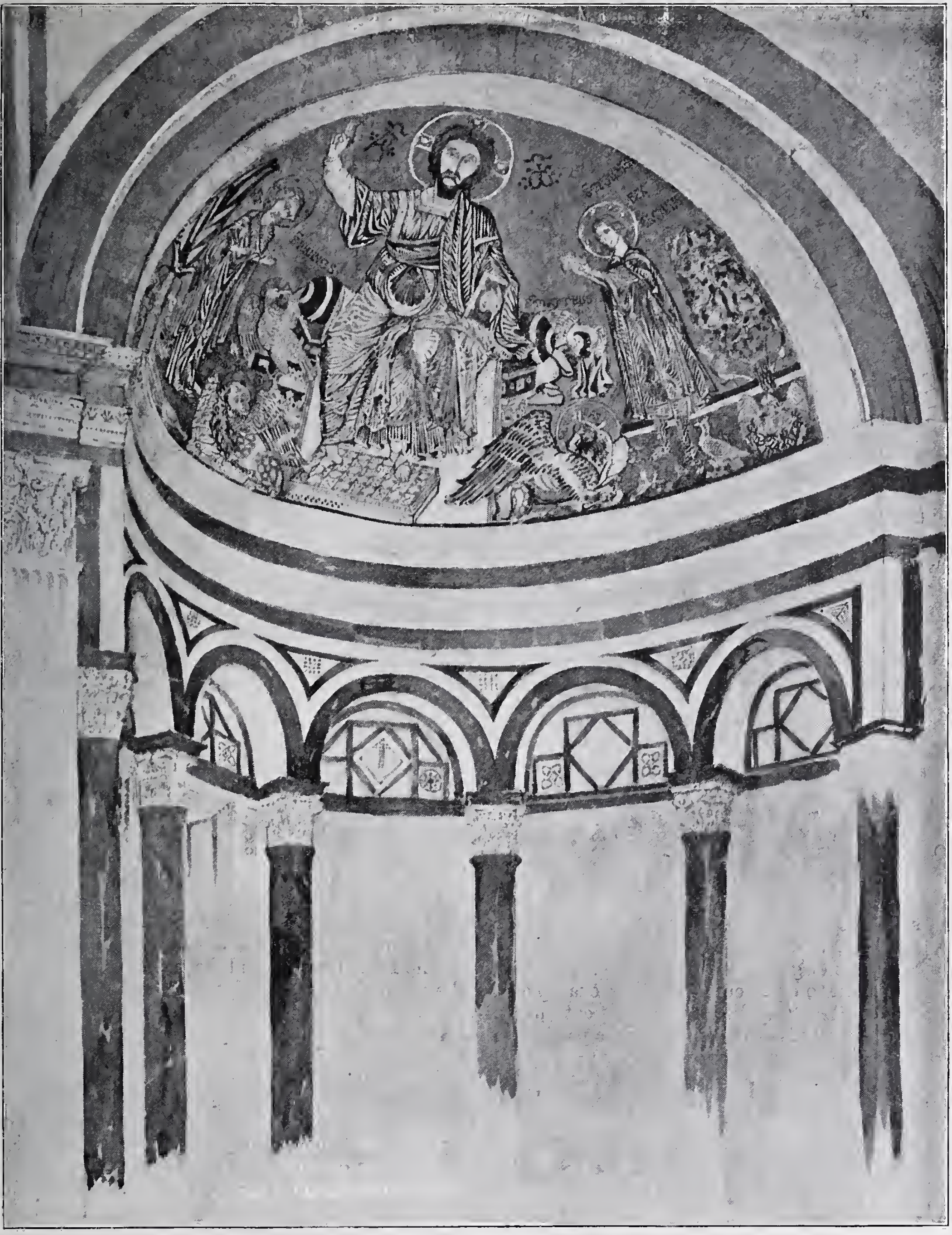

FIG. 5.—Structural and Applied Decoration, 12th and 13th century. In mosaic and coloured marbles. S. Miniato al Monte, Florence.

who saw Athens in at least some of its early splendour, the monuments themselves have told us, by no uncertain statements, that they were treated originally with complete and beautiful schemes of polychromatic decoration. On buildings still remaining in the Sicilian colonies of Greece plain indications of a similar treatment have been found. And we are told that Panænus, a brother of Phidias, was a painter who decorated in colour part of the temple of Jupiter at Olympia; but the documentary evidence is trifling compared with the more reliable indications already mentioned.

The lack of much written testimony, concerning the use of colour in architecture as it was practised by the Greeks, is thought by some to be an argument showing that its use was general; and also that those who described the monuments were thus acquitted of any need to explain what was obvious to their contemporaries. However, we must let the buildings tell their own tale. And for this purpose it must suffice if we refer only to some in Athens itself, where the best products of Greek art were to be found. These were built chiefly with ivory-white marble from Attica, used in the work as definite functional parts of the structure, not applied only as a superficial veneer.

The temple of Theseus, it is supposed, was once partly covered with a thin coating of stucco, for some surfaces have been treated with a point, so as to make the plaster coat fast to the walls. Whatever the finished surface was, colour had been applied to it. The figures in relief on the frieze of the entablature inside the peristyle had been painted, and the ground on which they were cut was blue. The various fascias had been decorated with conventional patterns in red on the white ground. Red, green, and blue, with some use of gold, were the chief colours used. The ceiling of the porticoes had a blue ground, and on it were glittering stars of gold. Some of the outside entablature was also coloured, the untouched part being the plain white ground of the marble. The soffits of the mutules in the cornice had been painted blue, and out of this ground the guttæ stood as spots of gold.

The Parthenon presented another example of the use of colour applied to marble externally. Whether the reliefs of the Panathenaic procession had been coloured we cannot say, but the ground of the frieze apparently was blue. The outer entablature, like that at the temple of Theseus, had been coloured on some of its members, but gilding was used more freely. The fasciæ generally were painted with the running honeysuckle or palm designs, and the ovolo mould had been covered with what we generally call the egg-and-tongue ornament. The running ornaments seem to have been done in red. Upon the architraves of many of the temples gilt shields had been placed, so that the plainness of this member was varied by the amount of relief these applied objects would afford.

In studying what archæology has discovered about Greek methods of using colour in architecture, we are struck with the careful restraint under which they evidently placed themselves in adopting this tempting means of adding emphasis to architectural forms. Like the Egyptians, they worked under climatic conditions favourable to the free use of applied colour externally. But they used in structure valuable material which of itself formed a decoration in colour which they, wisely, did not destroy. They were careful not to allow a delight in things beautiful to lead them into any useless and unreasonable profusion by its indulgence. Their art was essentially rational. And by it they showed, in their great admiration of the human form, that they contemplated with pleasure their own being; for the beauty and intellectual power of humanity was the chief object and motive of all their artistic expression.

The Greek mind during the Periclean age was evidently somewhat severe but refined in its tastes, for we do not find much evidence to show that they used coloured marbles in the manner that was developed by the Imperial Roman school. The earliest marble pavements, such as those which have been found in Greece, were plain large slabs of white marble, but it is known that more decorative tessellated pavements were also designed by them.

The remains of work in Sicily show us that often, especially in their colonies, the Greeks had built their structure of rough materials, and finished the architectural forms in a moulded and modelled stucco. This they had painted in the same manner as they had decorated the marble in Athens. In Sicily, too, the grounds to sculpture in relief were often red.

It is not definitely known how much the Greeks used colour for subject-work in fresco, but examples of painted decoration showing figures in action, after the manner of the Parthenon frieze, have been found, though in a rather fragmentary condition.

The Ionic temples had been coloured in much the same way as those Doric ones which we have named. But in the later work it would appear that much which had been painted decoration was cut and painted as well, or allowed to remain without definite colour beside that which the marble and the lights and shades of a relief could give. This was more the custom of the Alexandrian period, but it does not seem a sufficient explanation of the surprise and fear expressed by Pliny when he observed that the Romans were "beginning" actually to paint the "stones," or marble, of their buildings. He says the custom was begun when Claudius was emperor, and that the imitation of marbles by coats of coloured lime was practised in the time of Nero. Under

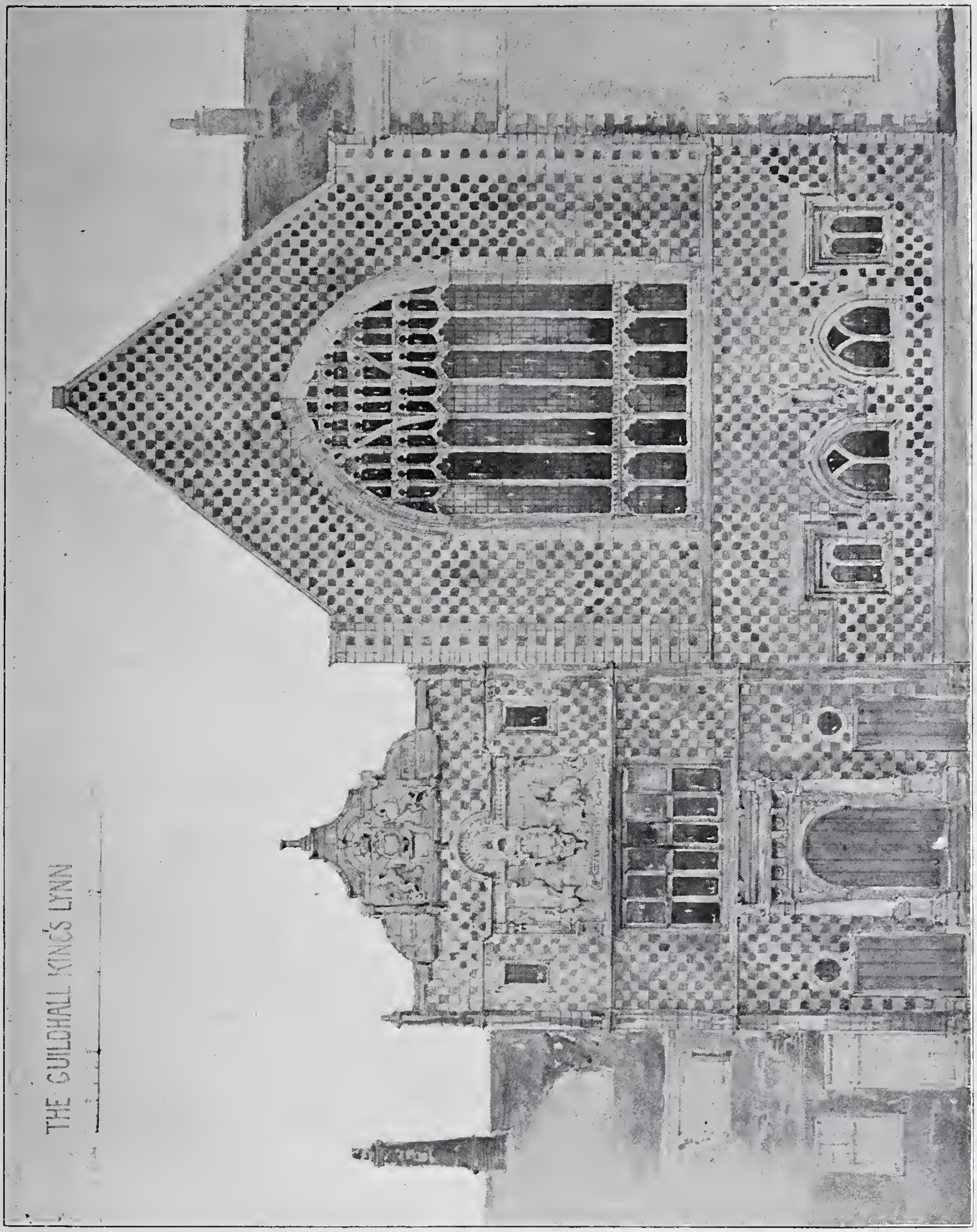

Fig. 6.—Structural Decoration, 15th and 17th centuries. In flints and stonework. The Guildhall, King's Lynn.

the rule of the latter we should not be surprised to find hypocrisy studied as a definite branch of art.

Græco-Roman.—Some reference has already, incidentally, been made to the use, by the Græco-Roman designers, of colour in relation to architecture. Much of the best work that they had done was destroyed by the raid made by the new-born Christian art upon the quarries which the works of old Rome provided. For such they were evidently considered to be by all those who wished to build a church, after Constantine had made such depredations permissible. Nevertheless, we know well that the Romans, by aid of Greek skill, had done many beautiful things with colour. But they used ideas of application to so large an extent that they were the means of establishing a false principle in art. And this was embodied in their practice of taking the rationally developed features of Greek architecture, and fastening them on, or building them in, as parts of their own structures. They thus attempted to make architecture of building, without the expenditure of that thought and skill which was necessary in order to develop, from the essentials of their own buildings, that which was required to complete them as works of artistic design. In their bridges and aqueducts, and such other feats of engineering skill, they frequently attained to that at which they had not so much aimed as in their civil and palatial compilations.

But in decoration they had made that perfectly legitimate use of materials which we shall find was so completely adopted by the Byzantines in St. Sophia and other churches in the East, as well as in later works of a similar type. We refer to the application of thin slabs of marble, coloured and plain, to walls of another and rougher material.

Pavements they not only made at home, but in every colony they left examples. Indeed, it is recorded, so fond were they of a good pavement, that mosaic ones were taken by some Roman leaders for use during their campaigns.

Deriving from Greece, among other things, the use of marble as paving, whether in slabs, inlay, or mosaic, the Romans also took from the same source their ideas concerning the use of colour as painted decoration. The Greeks were, in fact, the people from among whom Rome sought out her artists. But it was not until Egypt was her tributary that she so much indulged her love of luxury by a use of the precious marbles which she was able then to procure. By the same political event a great impetus had been given to the use of glass as a coloured material.

For examples of the painted decoration of Imperial Rome we must largely draw from such information as Pompeii and Herculaneum, more especially, may afford. It is from these that we may learn not only what Roman policy and pleasure had adopted, but also in a degree that which Hellenic refinement had effected in the home as essential to a full satisfaction of their intellectual subtlety and artistic caprice.

All of this Pompeiian painting is interesting archæologically; some of it is good decoratively, but most of it is bad in every way. It carries with it too much of the luxurious Roman depravity to be truly beautiful, but at the same time it shows us, in nearly all instances, that the decoration was done in flat tints of colour, excepting where they gave detailed representations of the human form, birds, and beasts. But the work was grotesque without being amusing; and when it introduced such a motive as a full-grown bull, standing erect and ready for the fray, with no better support for its ferocity than the delicately painted tendrils of a weakling scroll of vines, then it became ridiculous.

But illustrations of painted decoration, characteristic of this period, may often be seen in which there is fine design, excellent drawing, and good colour, with but little extravagance in the motives employed. The chief grounds adopted were brilliant red, blue, or gold. Green was sometimes used for the same purpose, and also black and white.

(*To be continued.*)

THE ROYAL GOLD MEDAL 1899.

Presentation to Mr. G. F. Bodley, A.R.A., at the Meeting of the 26th June 1899.

ADDRESS BY MR. W. M. FAWCETT, M.A., F.S.A., *Vice-President.*

Ladies and Gentlemen,—

It is with great regret that you will all hear that our President is laid up and under the care of his doctor, who absolutely forbids his venturing here to-night. I hope his illness is not dangerous, but he is told that he must not on any account move about.

I particularly regret it, for it would be much more satisfactory to you all if the Royal Gold Medal had been presented by his hands, rather than by those of a country cousin, whom for the last few years you have honoured with a place on your Council.

There is one reason beyond that of being your senior Vice-President which makes me not entirely out of place. I have known Mr. Bodley for longer than I have known anyone in this room. It was, I think, in 1852, when I was little more than a boy, that he came to Leeds to help a friend of his long since passed away. I well remember how he graphically described the delivering up of the drawings in some verses, which I fear are now absolutely lost to posterity. If long acquaintance, and I hope I may say friendship, is any title to the honour I feel in presenting this Medal, I think I have perhaps shown that I possess it. I have also the further title in that I have always been a great admirer of his work, feeling that he is indeed a true artist, whose designs and conceptions will receive the approval and admiration of generations yet to come.

We have the further pleasure of welcoming Mr. Bodley among us as a Fellow. We all know the broad view taken by this Institute with regard to the profession—that there has never been any wish to coerce architects to join us, although we believe that the action of the Institute has been of great value not only to the architectural profession, but to architecture as an art. Feeling this, we cannot but rejoice in numbering Mr. Bodley in our ranks.

Mr. Bodley's work is so well known to you all that it hardly needs comment from me. Soon after leaving Sir G. G. Scott's office he commenced practice on his own account, and St. Michael's Church, Brighton, was one of his early works. At this time he was feeling the monotony of the work done—he must have felt it as what I have heard described as Gothic " revived but not revivified "—and, after some travel abroad, he evidently felt relief in the change to French work, and hoped to get *life* by working freely with it. This phase did not last long. He soon felt that mere variety was not life. He was a young man striving for the light, but he was also a strong man, and, like a great ship which requires the buffeting of a voyage for it to settle down in its true lines, it was necessary for him to pass through a struggle of this kind before he could grasp his work and give life to our own English Gothic. How far he is personally sensible of this I can hardly say; I am speaking as to how it appears to a brother architect. St. Martin's, Scarborough, was another of his early works where the

French idea is less pronounced, and where we can feel the influence of the Priory of Kirkham not far off. All Saints' Church, Cambridge, which was built in the early sixties, has no trace of this French fever, which by this time had passed quite away.

It is impossible here to enumerate and describe all the buildings he has carried out, but I may mention the Eton Mission Church at Hackney Wick. The church at Clumber for the Duke of Newcastle is also a particularly fine work. The church at Eccleston for the Duke of Westminster is, if possible, more successful. It is hardly finished, as the screens and reredos are not yet fixed; but it has been an opportunity for carrying out a complete work with all its accessories, and the unstinted and munificent wealth of the donor has probably not made the successful result less difficult. In quite a different style is the church for the Cowley Fathers at Oxford. There the work is remarkable for its quietness and simplicity—but what a grand simplicity it is!

It is not in church work alone that Mr. Bodley has won his laurels. The addition to King's College, Cambridge, and the restoration of the library at Christ's College, and many other buildings, show the same delicate care, the same longing for simplicity, truth, and repose. The Deans and Chapters of York and Peterborough may be congratulated on having called in Mr. Bodley to take charge of the repairs in their cathedrals—repairs under which such delicate questions arise between the antiquary, the pure artist, and the practical architect.

Mr. Bodley has also shown great power in carrying out decorative work, both in colour and in that of a monumental kind. Of the latter I need only mention the tomb of Archbishop Thomson at York and that of Bishop Woodford at Ely, both of them showing great power of design and wonderful care, even to the most minute detail.

He has shown also in colour the intense knowledge he has of its value when properly applied, and he has also shown how to handle it. I should be inclined to place this knowledge and management of colour as perhaps the highest of his artistic faculties.

It is therefore with feelings of great pleasure that I have the honour of presenting the Royal Gold Medal to Mr. Bodley, and I am sure that all our members feel also the honour of having such a distinguished artist among us.

MR. BODLEY'S REPLY.

Mr. Chairman, Ladies, and Gentlemen,—

In more ways than one I am unprepared to say anything to you to-night, for I have been labouring under a mistake. I thought that to-night we were to have a pleasant family dinner, or rather a club dinner of the Institute, and that to-morrow was to be the day for speeches. So I was thinking that when I got home to-night I would think of something to say to you. I have not had the opportunity of doing so.

Gentlemen, this honour that you have given me was as unexpected as it was unsought. Indeed, I may not have been quite respectful to the Institute, for it is not many years ago that I took part, with Mr. Norman Shaw, Mr. Jackson, and others, in writing a paper arguing against the Institute's idea of examination being used as a test for the profession of architecture. Our feeling, and our *one* feeling, was that it might tend to make the profession and our work less that of an art, and too much that of a profession.

Gentlemen, I think I owe this honour of receiving the Gold Medal more especially to my great love for that style of architecture which I have always held, and do hold, to be the most beautiful style—I mean the English Gothic of the Middle Ages. I believe that this style is like Greek work in its great refinement and great delicacy. Architecture then reached a perfection of which we have hardly a perception now. Our work is so confused, so mystified by many styles. In old days there was unity of feeling, and I cannot but think that the more we can hark back and try to use one style the better it will be. This may be Utopian, it may be impossible; but what a thing it must have been in those days, not to have muddled in selecting a language to speak in. There was one language; for, after all, style is only language. If a Frenchman has anything to say he will say it in French, if an Englishman in English, a German in German, and so forth. And now we think so much of our styles and do not think enough of what we have to express, what we have to say, what we have to tell the world —and that is, that Nature is right, Nature is beautiful, and that Architecture and all the arts have been established and built up, generation after generation, by the traditions of the past. I think we are rather too apt to ignore that, and are apt not to think enough of *principles*; I mean such principles as that of truth, and above all perhaps of refinement. For I do believe that that is a thing that is lacking in the present day in our architecture. Our buildings have grown. You know, as you go through the streets of London, how you see them growing. Have they grown in refinement? For in all arts—literature, painting, architecture, sculpture—you want that refinement and nicety, and it is that which makes the real and living work of art.

9, Conduit Street, London, W., 1st *July* 1899.

CHRONICLE.

The Royal Gold Medal.

The presentation of the Royal Gold Medal to Mr. G. F. Bodley, A.R.A., on Monday the 26th ult., was witnessed by a numerous gathering of members and visitors. Mr. Bodley met with a very hearty reception, especially cordial from members, who owing to his recent election were able to greet him as one of their number. As this was his first attendance, Mr. Bodley was formally inducted as a member, and signed the Register of Fellows. Among the assembly were four past Gold Medallists—viz., Mr. Alfred Waterhouse, R.A., LL.D., Sir Arthur Blomfield, A.R.A., Mr. James Brooks, and Mr. Ernest George. Mr. Joseph Smith, President of the Allied Society at Sheffield, and representing that Body on the R.I.B.A. Council, was in attendance for the first time, and signed the Register of Fellows. Water-colour drawings of St. Mary's, Clumber, and a number of photographs of others of Mr. Bodley's executed works, were hung in the meeting-room.

Professor Aitchison, R.A.

Very genuine regret was occasioned by the inability of Professor Aitchison to preside at the Gold Medal function and at the Annual Dinner of the Institute on the following evening. These were to be the Professor's final acts in the Presidential office, and much sympathy was aroused by the news that he was too unwell to go through with them. The following letter was received from the Professor on Monday, and read to the General Meeting that evening:—

24th June 1899.

"I beg to express my regrets to the Meeting for my absence to-night, but the doctor absolutely forbids my attendance. I hoped not only to present Her Majesty the Queen's Gold Medal to Mr. Bodley, and to give him my most sincere congratulations, but to tender my thanks to my brother architects not only for electing me to the office I vacate this evening, and for the distinguished honour they did me in electing me for a third year, but also for the courtesy and kindness I have received at their hands during my term of office, and to offer my congratulations to the new President. G. Aitchison."

At the close of the business on the agenda, a vote of thanks to the retiring President for his services during the three years he has held the office was moved and seconded in the following terms:—

Mr. Aston Webb [*F.*], A.R.A.: Mr. Chairman, Ladies, and Gentlemen, to-morrow night at our Annual Dinner we shall be welcoming our new President. It seems only fitting that to-night we should say a word of farewell to the gentleman who has honoured us for the last three years by presiding over our affairs. Professor Aitchison, to the great regret of all of us, is not able to be here to-night, and it is therefore perhaps still more fitting that we should send him a message of thanks and of sympathy at the present time. He has been with us so much, his genial presence has encouraged us so much, and his wonderful good temper and good nature through the difficulties which naturally arise alone form a reason for offering to him our best thanks. But in addition to that he has performed a very large number of duties which no one but the President can perform. The three years during which he has presided have not, perhaps, been very eventful ones. I, for one, am not sure that the Institute is not better for having some uneventful and quiet years. I do not think we want always to be passing through a crisis, neither do we always want to be reformed. The Italians have a proverb, that it is not the best wheel in the cart that makes the most noise. I think that may be applied here. It is not necessary to make a great noise or a great show in order to be a most valuable help to the Institute. During those three years our President has had to act for us in a most important matter in which the Government consulted him, namely, in the matter of the new public offices in Whitehall—a very responsible position. A new—or, rather, revised—schedule of charges has also been brought to completion. A large number of annual dinners in the provinces and elsewhere have been attended by our President, which involve no small sacrifice of time and convenience. He has delivered no fewer than three Opening Addresses, and I think that all who have heard those Addresses will admit that he gave of his best to us. They were full of thought and full of research. Perhaps there is hardly any one, possibly no one, who has more archæological knowledge of architectural work than Professor Aitchison. He has not stinted in giving us of his knowledge; and I might also say that in those Addresses, in looking forward to the architecture of the future, he has not tied us altogether to that archæological knowledge of his, but has looked forward to the advancement of architecture, to the advance of design in architecture. He has always impressed upon our young men the necessity, if we are to keep up with the times, of considering the employment of new materials, the necessity of grasping problems and striving to solve them—problems of plan, problems of design, and problems of every kind that so frequently confront an architect in the course of his practice. He has also held up for us a very high ideal of that practice—of honourable practice towards one another, and of honourable dealing towards those who employ us. For three successive years he has delivered Addresses to the students, and Addresses on the occasion of the presentation of the Gold Medal to Dr. Cuypers and to our dear friend Mr. Ernest George. He has also been the means of bringing many distinguished men from abroad into our ranks, which is a thing comparatively few of us are able to do. At least eleven eminent men from foreign countries—from Belgium, from France, from Portugal, from Copenhagen, Italy, Spain, New York, Brussels, Rome, and St. Petersburg—have been brought by him to our ranks. I think, Sir, I need say no more, but I am sure we all wish in this time of illness to assure him that we appreciate very much the services he has rendered to us, and hope that he will soon be well again, and to assure him that we shall always be glad to think that we have had George Aitchison as President of our Institute.

Mr. H. Heathcote Statham [*F.*]: Sir, I have very great pleasure in being allowed to second this vote of thanks, which I do with my whole heart. Professor Aitchison is one of my oldest friends in the profession, and not only my personal feeling prompts me to speak warmly on behalf of him, but also my feeling of the manner in which he has always kept before us the highest aims of the art. Mr. Aston Webb has said so much, and so well, on that point that he has hardly left anything for me to say; but there is one point I would refer to that he did not touch upon, and that is the remarkable series of lectures on architecture which Professor Aitchison has delivered at the Royal Academy. I hope that those lectures will eventually be published in a permanent form, and be open to all the world; they will be found, I believe, to be a most valuable *résumé* of what you may call the critical history of architecture—not merely laying down the history, but drawing the lessons from it, which are the great use of the study of the history of architecture; and I think that he brought to those lectures a very remarkable amount of intellectual perception and intellectual labour. I desire, Sir, to second most heartily the vote of thanks which Mr. Aston Webb has proposed.

The vote of thanks was carried by acclamation.

On Tuesday Professor Aitchison addressed the following letter to his successor in the Presidential chair, and extracts from it were read to the guests assembled at the Annual Dinner that evening:—

150 *Harley Street, W.*: 27*th June* 1899.

Dear Mr. President,—I hope you will make my excuses and express my sincere regret that I am unable to be present to-night, but I am laid up with synovitis, and the doctor will not hear of my coming.

The Dinner was to have been held during my term of office, although it was unavoidably postponed; but through your amiability I was invited to preside. You may picture to yourself the keen disappointment I feel in not being able to be present when we have been favoured with so many distinguished personages, and when there are so many of our brother architects to whom I desire to address my thanks on retiring from the distinguished position to which they had elected me. It is an occasion when one may say a few words in praise of the art we follow, and also about the great institution to which we all belong.

Government did us the honour of asking the

Institute to nominate the competitors for the new central public buildings at Kingston, Jamaica, in 1896; also for the new Government offices in London in 1898; and the Corporation of the City of London have also done us the honour of asking us to furnish the names of competitors for their new Criminal Courts in the City of London.

I have no hesitation in saying that the foundation of this Royal Institute has done much to raise the status of the profession, and that the examination it started some twenty years ago has greatly stimulated the students of architecture to energetic exertion.

Architecture is a peculiarly patriotic art: it not only dignifies and embellishes cities where its monuments are erected, and causes them to be spoken about throughout the world, but it compels all who wish to see them, even in ruin, to come to the city itself. If you want to see the ruins of the masterpieces of Greek architecture you have to go to Athens, to Arcady, or Asia Minor. Not only does every architect desire to see English architecture foremost in the art, but also every one of the distinguished visitors we have here; so I hope that no exertion will be wanting in our architects, when they have a monument to erect, to make it perfect, and that every one of our distinguished visitors will endeavour to procure the noblest building for himself or his city, and will cherish and applaud the architect who has given it to him, for it appears to me that in all the fine arts the works done are excellent in proportion to the knowledge of the lovers of the art. — Yours sincerely, G. AITCHISON.

W. Emerson, Esq., President R.I.B.A.

The New President.

Before the Meeting separated on Monday, the Chairman, on behalf of the Institute, warmly congratulated Mr. William Emerson on his accession to the Presidency. The new President, who on rising received a very hearty greeting, thanked the Meeting for their kind and encouraging reception. He had been, he said, Hon. Secretary of the Institute for several years, and the fact of his election as President proved, he hoped, that he had not been remiss in the duties of the post he was now vacating. He had a deep sense of the great responsibility and the great honour that attached to the Presidential Chair. He felt also some trepidation in taking up the post when he thought of the names of those who had gone before him. They represented so many great and honoured men, learned scholars, gifted artists, that it was a difficult post to fill. He trusted he might meet with the kind consideration of members in all his actions.

Sir L. Alma-Tadema, R.A.

With reference to the vote passed at the Meeting of the 12th ult. congratulating Sir L. Alma-Tadema, R.A., on his recent honours, the following letter has been received, and was read to the Meeting last Monday:—

17 *Grove End Road, St. John's Wood, N.W.:*
15th June 1899.

DEAR SIR,—In answer to your letter of to-day's date, I beg to say that I am much gratified by the General Meeting of the Institute of the 12th inst. voting such welcome congratulations on the occasion of my knighthood.

I shall feel much obliged if you will find an opportunity to lay before the members the expression of my sincere gratitude for the kind thoughts they expressed on my behalf.—Believe me, Dear Sir, Yours very truly,

The Secretary R.I.B.A. L. ALMA-TADEMA.

The Annual Dinner.

The Annual Dinner, duly held on the 27th ult. at the Whitehall Rooms, Hôtel Métropole, passed off very successfully, members and guests present numbering altogether 160. As already stated, the retiring President, Professor Aitchison, R.A., who was to have taken the Chair at the function, was suffering from indisposition and unable to attend. His place was taken by the new President, Mr. Wm. Emerson, who took an early opportunity of reading to the guests the letter from Professor Aitchison above printed, and giving expression to the sympathy all felt with the Professor in the unfortunate cause of his absence. Lord Wemyss, Mr. Akers Douglas, Sir W. H. Preece, and Col. and Sheriff Probyn had intended to be present, but were unfortunately prevented at the last moment. The President was supported on his right by the Bishop of Ely, Messrs. Charles Barry and J. Macvicar Anderson, the respective Presidents of the Royal College of Physicians, the Royal Society of Painters in Water Colours, the Incorporated Law Society, and the Surveyors' Institution, Sir Wm. Richmond, the Dean of St. Paul's, Sir John Taylor, the Master of the Plumbers' Company, Mr. James Brooks, and the Vice-Chairman of the London County Council; on his left were Sir Richard Temple, Mr. Penrose, Sir Alexander Binnie, Messrs. W. M. Fawcett and G. F. Bodley, the Dean of Westminster, Sir Henry Trueman Wood, Mr. T. W. Russell, M.P., the President of the Royal Institute of Painters in Water Colours, Mr. Aston Webb, Archdeacon Sinclair, Mr. Thomas Brock, the President of the Royal Institute of Ireland, and Mr. Ernest George. During the evening a selection of music was performed by the Leoni Ladies' Quintette.

The following is a complete alphabetical list of members and guests present:—

Mr. D. Comba Adamson; Mr. J. Macvicar Anderson [*F.*], F.R.S.E., *Past President*; Mr. Richard Armstrong [*F.*]; Mr. Frank T. Baggallay [*F.*]; Mr. Thos. J. Bailey [*F.*]; Mr. Charles Barry [*F.*], F.S.A., *Past President, Royal Gold Medallist*; Mr. C. E. Barry [*A.*]; Mr. W. C. Beetles; Sir Alexander Binnie [*H.A.*]; Mr. G. H. Blakesley; Mr. Thomas Blashill [*F.*]; Mr. G. F. Bodley [*F.*], A.R.A., *Royal Gold Medallist*; Mr. S. Bolton; Mr. Thomas Brock, R.A.; Mr. C. W. Brooks [*A.*]; Mr. James Brooks [*F.*], *Past Vice-President, Royal Gold Medallist*; Mr. J. M. Brydon, *Vice-President*; Mr. R. H. Burden [*F.*]; Mr. J. J. Burnet [*F.*], A.R.S.A.; Mr. J. T. Cackett [*F.*]; Mr. T. M. Cappon [*F.*], President of the Dundee Institute of Architecture; Mr. Arthur Cates [*F.*], *Past Vice-President*; Mr. Arthur Chandley; Mr. T. C. Cheesman; Dr. Church, President of the Royal College of Physicians; Mr. Thomas E. Collcutt [*F.*]; Mr. H. H. Collins [*F.*]; Mr. W. G. Cooke [*A.*]; Professor Corfield [*H.A.*], M.D.; Mr. F. J. Corfield; Mr. Alfred Culshaw [*F.*]; Mr. E. C. Davies; Mr. Campbell Douglas [*F.*], *Past Vice-President*; Mr. Thomas Drew [*F.*], President of the Royal Institute of Architects of Ireland; The Right Rev. the Lord Bishop of Ely [*H.A.*]; Mr. William Emerson, *President*; Mr. C. Evans-Vaughan [*F.*]; Mr. W. M. Fawcett, F.S.A., *Vice-President*; Mr. Lawton R. Ford [*A.*]; Mr. Frank Fox [*A.*]; Mr. George Frampton, A.R.A.; Mr. Starkie Gardner; Mr. Ernest George [*F.*], *Past Vice-President, Royal Gold Medallist*; Mr. James S. Gibson [*A.*]; Mr. William Glover [*F.*], President of the Northern Architectural Association; Mr. Alex. Graham, F.S.A., *Hon. Secretary, Past Vice-President*; Mr. G. E. Grayson [*F.*]; Mr. Arthur Green [*F.*]; Mr. Leslie W. Green [*A.*]; Mr. E. J. Gregory, R.A., P.R.I.; Mr. Alfred Griffin; Mr. John Griffiths; Mr. Albert L. Guy [*A.*]; Mr. Leslie H. Gwyther; Mr. W. W. Gwyther [*F.*]; Mr. Edward Hanson; Mr. Henry T. Hare [*F.*]; Mr. C. Forster Hayward [*F.*], F.S.A.; Mr. F. H. A. Hardcastle [*A.*]; Mr. Christopher Harston [*F.*]; Professor Hauszmann, *Hon. Corr. Mem.* Buda-Pest; Mr. Frederick Hellard; Alderman Richard Hind, Master of the Plumbers' Company; Mr. George T. Hine [*F.*]; Mr. Francis Hooper [*F.*]; Mr. George Hornblower [*F.*]; Mr. I. G. Hossack; Mr. Marcus B. Huish; Mr. F. G. Humphreys; Mr. E. F. Hunt; Mr. F. W. Hunt [*F.*]; Mr. John Hunt; Mr. Charles Val Hunter [*A.*]; Mr. B. Ingelow [*F.*]; Mr. E. A. Johnson [*F.*]; Mr. George Judge [*F.*]; Mr. Samuel Knight [*F.*]; Mr. H. V. Lanchester [*A.*]; Mr. Wm. Leggott; Mr. Ernest W. Lees; Mr. G. A. Bligh Livesay [*F.*]; Mr. Berkeley Margetts, President of the Incorporated Law Society; Mr. Alfred Mart; Mr. E. H. Martineau [*F.*]; Mr. A. J. Meacher [*A.*]; Mr. Gaetano Meo; Mr. J. B. Mitchell-Withers [*A.*]; Mr. H. Percy Monckton [*F.*]; Mr. Edward Monson [*F.*]; Mr. Howard C. Morris; Mr. A. G. Morten; Mr. Ed. W. Mountford [*F.*]; Mr. W. Hilton Nash [*F.*]; Mr. James Neale [*F.*], F.S.A.; Mr. E. A. Ould, President of the Liverpool Architectural Society; Mr. Charles A. Owen [*F.*]; Mr. E. H. Oxenham; Mr. A. Wyatt Papworth; Mr. W. Kaye Parry [*F.*]; Mr. F. C. Penrose [*F.*], F.R.S., Litt. D., D.C.L., *Past President, Royal Gold Medallist*; Mr. E. W. Poley [*A.*]; Professor W. Ramsay, F.R.S.; Mr. Gilbert R. Redgrave; Sir W. B. Richmond [*H.A.*], K.C.B., R.A.; Mr. T. M. Rickman [*A.*], President of the Surveyors' Institution; Mr. R. Fabian Russell [*F.*]; Mr. T. W. Russell, M.P.; The Very Rev. the Dean of St. Paul's; Mr. W. H. Seth-Smith [*F.*]; Mr. C. H. Shoppee [*F.*]; The Ven. Archdeacon Sinclair; Mr. John Slater [*F.*]; Mr. Joseph Smith [*F.*], President of the Sheffield Society of Architects; Mr. J. Osborne Smith [*F.*]; Mr. P. Gordon Smith [*F.*]; Professor T. Roger Smith [*F.*]; Mr. N. J. Stanger [*A.*]; Mr. H. Heathcote Statham [*F.*]; Mr. Richard Strong, Vice-Chairman of the London County Council; Mr. W. H. Strudwick; Mr. Arthur Sykes [*A.*]; Mr. J. J. Talbot; Mr. Augustus W. Tanner [*A.*]; Mr. Henry Tanner [*F.*]; Sir John Taylor [*F.*], K.C.B.; Sir Richard Temple, Bart., G.C.S.I.; Mr. A. Hessell Tiltman [*F.*]; Mr. R. Frank Vallance [*F.*]; Mr. E. M. Bruce Vaughan [*F.*]; Mr. W. T. Walker; Mr. Paul Waterhouse [*F.*]; Mr. E. A. Waterlow, A.R.A., President of the Royal Society of Painters in Water Colours; Mr. A. M. Watson [*A.*]; Mr. Thomas Henry Watson [*F.*]; Mr. Aston Webb [*F.*], A.R.A., *Past Vice-President*; Mr. R. Douglas Wells; The Very Rev. the Dean of Westminster; Mr. T. Barnes Williams [*F.*]; Mr. Alfred Wills; Mr. W. G. Wilson [*A.*]; Mr. J. T. Wimperis [*F.*]; Mr. R. Winder; Sir Henry Trueman Wood; Mr. H. A. Woodington [*A.*]; Mr. Charles Woodward; Mr. Wm. Woodward [*A.*]; Mr. Wm. Young [*F.*]; Mr. Clyde Young; Mr. W. J. Locke, *Secretary*, and other officials of the Institute, and representatives of *The Builder*, *The Times*, *Daily News*, *Standard*, and the Central News Agency.

In proposing the usual loyal toasts, the President referred to the fact that the Queen and the Prince of Wales were both Patrons of the Institute. To Her Majesty the Institute owed the privilege of nominating the recipient of the Gold Medal for Architecture graciously presented by Her Majesty annually since 1848. The late Prince Consort and H.R.H. the Prince of Wales had frequently testified their interest in the affairs of the Institute, on occasion attending its meetings and presiding over their proceedings.

Mr. Aston Webb, A.R.A., *Past Vice-President*, gave the toast of "The Houses of Parliament." As loyal Englishmen they were grateful to their legislators for the time and ability they gave to the service of the country, but as members of the Institute they asked no favour from Parliament for themselves. They were not desirous of any legislation for artists, and, while delighted to see Parliament carry on the laws of the country, they did not ask for any laws for themselves. With the House of Lords he was afraid artists had comparatively little to do. The late Lord Leighton was appointed a peer, but unfortunately for them, and unfortunately for the House of Lords, he was not spared to take a seat in that assembly. Had he done so he would have been able as a member of that House to take part in the discussion of art questions when they arose, and possibly he might have been able to give a certain seriousness to the discussion of those questions which was not always to be found in legislative assemblies. With the House of Commons they had a closer connection, as from time to time architects had been members. As architects, they were agreed that it was advisable that architecture, as well as other sciences and arts, should be represented in the great popular chamber. There was no place where matters affecting architecture were so often dealt with as in the House of Commons. Apparently dry and uninteresting Bills were introduced by legislators dealing with the building of our large towns, and in these Bills some small clause might have the most disastrous effect upon the design and arrangement of buildings. Without the slightest wish to injure architecture, such clauses might be passed unless there were some one on the spot who could represent to the Legislature the bad effects they might have. A Bill had only within the last few weeks passed the House of Commons which would greatly affect the question of buildings in the Metropolis, and they were indebted to every one in that House who would be so good as to take an intelligent and active interest in architectural matters. They had also within the last two years had a scheme proposed by the Government for beautifying the part of London in which they were now assembled, and the Government had done the Institute the compliment to consult them in the matter. He thought he was speaking the mind of members when he acknowledged the courteous manner in which architects and the Institute had been treated during the negotiations.

The Right Rev. the Lord Bishop of Ely [*H.A.*] responded on behalf of the House of Lords, and hoped that when any question affecting architecture came before that body it might be dealt with in a way satisfactory to the Institute and to the great profession of which its members were students, masters, and professors. There was one point that he might fairly say connected the Parliament of this country with the noble science of architecture. That was the magnificent building, the noblest building in modern times, in which Parliament had the honour of meeting, designed by a man upon whom it reflected the highest credit, and whose son occupied a high place in the Institute.

Mr. T. W. Russell, M.P., responding on behalf of the House of Commons, said that was the first time in his life that he had met a body of gentlemen who wanted nothing from Parliament. He confessed that he found himself in a unique position, because he had never found any company of gentlemen in any part of this country, and certainly not in his own, who had nothing to ask from the Legislature. There were two questions, neither of them party matters, in which the Institute was interested, which he hoped the present Parliament would deal with before the end of its term. The first was the question of the housing of the working classes. He had the honour to serve a department in the State in which the Public Health Act and the Housing of the Working Classes Act of 1890 constantly came up for consideration, and no patriotic man could look with complacency on things as they were at present. The masses of the people were living in a way in which no gentleman would like either his horses or his dogs to live. This great country, rich beyond the dreams of avarice, must face the problem and see what could be done to remedy the evil. The Act of 1890, under which these things were done, was in the first place a most costly Act, and public-spirited municipalities who desired to put it into operation and improve the condition of the masses of the people in our great centres of population were met and oftentimes deterred by the enormous cost of operations under that Act. He said it was the duty of Parliament, regardless of party, because it was in no respect a party measure, to face an issue like this promptly, and endeavour to do something to alleviate the lot of the masses of the people who were compelled to live in this way. The next question, equally a non-party question, to which he would refer was the amendment of the Public Health Acts. It was now twenty or twenty-five years since these Acts were passed: their defects had now been proved, and it was high time that Parliament should once more deal with this question of the public health, and put greater facilities in the way of public bodies desirous of doing all they could for the health of the people. These were non-party questions, and the House of Commons, even in its highest party tantrums, always sought the public good. It never showed a stronger purpose than when it faced a non-party issue, and set about to do something for the great masses of the people.

Mr. W. M. Fawcett, F.S.A., *Vice-President*, proposing the toast of "Art and Science," referred to the two exhibitions of paintings recently held, the Rembrandt exhibition at Burlington House and the Turner exhibition at the Guildhall Gallery. No one could go and sit quietly and calmly and study such exhibitions as these without having his nature refined and ennobled by doing so. As to Science, they saw in the recent operations in Egypt how even the development of science in war might have the most beneficent results, while the discovery of the Röntgen rays had done enormous service in the alleviation of human suffering, and the liquefaction of hydrogen and air promised the greatest benefits to the race.

Mr. E. A. Waterlow, A.R.A., President of the Royal Society of Painters in Water Colours, said it was a great privilege to respond on behalf of Art in so distinguished an assembly. That Institute, whose generous hospitality they had all enjoyed, represented the very oldest of the arts—that of architecture, and he was asked that evening to represent the younger but still somewhat venerable art of painting. Of the art of painting every painter had a good deal to say, and he confessed it was somewhat of a relaxation to talk about a branch of art with which he was not quite so familiar. It was difficult to realise the tremendous effect upon civilisation that architecture had had. From the noblest edifice erected for the purposes of a temple to the humbler buildings which served as simple dwelling-places, all were the work of the architect. Our cities were dependent upon architecture for their very existence. Much, however, as they owed to architecture, let it not be thought that he considered architects perfect or unassailable. Their brethren of the brush had a very grievous complaint to make about them. Not content with employing their genius in the construction of magnificent exteriors and interiors, they had of late taken to decorating the walls of such interiors in such a manner that the poor painters had very little chance of being represented on those walls. He alluded to the modern practice of dividing the walls into panels, on which were hung costly silks and tapestries, and on which it was considered sacrilege to place a mere oil or water-colour drawing. He asked them, did they consider it a brotherly action thus to give the preference to the upholsterer over the artist? How could a mechanically repeated arrangement of sunflowers or tulips, in however costly a material, satisfy their intellects in the same way as the contemplation of beautiful works by an Alma Tadema, a Waterhouse, or Sir William Richmond! He trusted they would forgive this little grumble; he knew the feeling was shared by many of his *confrères*, and he was delighted with the opportunity of setting it before them as food for their reflection.

Sir Alexander Binnie [*H.A.*], responding for Science, remarked on the vast strides which had been made since a hundred years ago. If they contemplated the discoveries of Watt and of Arkwright, not only in their scientific, but in their social aspect, and saw how those discoveries carried this country triumphant through the great struggles which it had to undergo at the time of the French Revolution, and brought us out of that struggle a dominant and great manufacturing power, he thought they must all acknowledge that in these respects Science had offered to the country a great and useful service. In recent times Science had contributed perhaps more directly than ever before to the health and welfare of mankind by the discoveries in regard to micro-organisms with which engineers had constantly to deal, organisms which did so much to remove the effete matter of civilisation and promote the health of our enormous communities.

Sir Richard Temple, Bart., G.C.S.I., proposed the toast of "The Royal Institute of British Architects and the Allied Societies." He said he had to couple with the toast the names of their President and of Mr. Thomas Drew, President of the Royal Institute of Architects of Ireland. The Institute of Ireland was an Allied Society, which was doubtless included in the toast because all Englishmen present would desire to testify to their fellow-countrymen in the Emerald Isle their sympathy with Irish art, from its glorious commencement in past ages down to the present moment. But the Allied Society which he was particularly commanded to mention to them on that occasion was, first, the Institute of Architects in New South Wales. This was a happy moment for the inclusion of that Institute in the toast, because with the new Australian Federation they would be obliged to have a new capital, which would be sedulously segregated from any of the existing capitals. Therefore, with a new capital —a federal capital—which would be the Queen of the Antipodes, what a field there would be for architects! A second possible Allied Society over the seas was that of Johannesburg. That would be a hopeful omen for the future, and show that the Johannesburgers were quite intent on getting their rights; and when they had got them, why, of course, the first thing they would do would be to build a new capital, with public buildings, another grand field for the architects of Great Britain. To revert to the affairs of their own Institute, outsiders like himself were glad to find that though it might not be part of their original charter, yet of late years they had provided that all young men admitted to their honoured ranks professionally should pass professional examinations in all branches of science and art related to architecture. As one of their heartiest well-wishers, and one who had had the honour more than once of addressing them in their lecture-rooms, he prayed to the All-wise Disposer of events that for the sake of their country they might always be artists first and fundamentally, as well as builders, architects, and civil engineers. They should remember that the great men departed, who had adorned our land with so many imperishable monuments, were all artists first. Then he prayed that they might be, as their predecessors had been, and as he hoped their successors would be, inspired with the grand idea, the subordination of parts to the principal effect —for effect was everything in matters which concerned art. Then he prayed that they might always look to perspective—that is to say, that they might consider not so much how a thing would look by direct vision as by oblique. They had some grand instances of that in England. He wished his respected friend Mr. Alfred Waterhouse had been present to hear him declare that the most signal instance of that was to be found in his building at South Kensington. Then he hoped that they might always have the national idea of architecture. Whatever their buildings were, let them not be French or German or Italian, but English. He said that without derogating from foreign architecture, but our buildings must be suited to the rough, hardy nature of our people and to the climate of our country. Then he prayed that our architects might not be too much interfered with by the civil authorities. As a practical man, he knew the irreparable damage which had been done to some of our finest buildings by interference of this kind. Let those responsible explain to the professional man what was wanted, and leave him to carry it out. He could point to buildings in this metropolis which had been utterly spoiled by one-sided interference of this character. Before he resumed his seat he would like just to point out to them one instance which fulfilled all the principles he had ventured to pray for. The Bishop of Ely had very properly mentioned the finest structure in England and in the world. He (the speaker) had seen, he thought, all the finest structures in the world, and the finest of them all was our own Palace of Westminster. He was proud to say that, he believed, in the presence of the son and grandson of the architect. That building had breadth and simplicity of outline, to which was subordinated an infinitude of beautiful detail. It was the one building which had the true idea of the Gothic, later Gothic, English Gothic. It was also a building which was truly national—unmistakably national—and adapted to the climate and atmosphere of the Thames; and it was a signal instance, he believed unequalled in the world, of grandeur and breadth of effect, whether seen directly or obliquely in perspective. Now, if this was true, he might claim for it that it combined all the merits of which architecture was capable. He said that quite advisedly, having, as his friend Mr. Russell knew, seen a good deal of it continuously for many years. In conclusion, he mentioned that he first became acquainted with their Chairman, Mr. Emerson, many years ago, when that gentleman was importing into our Eastern Empire the best principles of British art.

The President, in responding to the toast, said that after the eloquent speech of Sir Richard Temple there was really little left for him to say. Some time ago he was arguing before a committee against the insertion in builders' contracts of a clause binding the builder to pay trade-union wages. He was rather startled by a man getting up and saying that he ought to be ashamed of himself for arguing so, because he was a trade unionist himself. He denied it, but the man said he could prove it, as he was a member of the Institute of Architects, and there was a Bill in Parliament for the purpose of legalising, registering, or licensing architects. "What is this," he said, "but trade unionism?" Of course, he (the speaker) had to point out that the Bill was brought forward by a body of men, some of whom he believed were architects, but a body which had nothing to do with that Institute, and that the Institute had always opposed the Bill, and had spent much money in doing so, for sufficient reasons, which he could not enter upon at present. It was true that any man could now call himself an architect if he liked. No doubt that was an evil, and required a remedy. But they did not hold that this ill-considered Bill would alleviate the evil at all. A much more beneficial effect would, it was hoped, be produced in the future by certain steps which for various reasons had already been taken. They had now, as all present knew, a compulsory examination for the Associate membership of the Institute. No young man could become an Associate member now without passing a severe examination as to practical and theoretical building work in connection with architecture. With regard to the heaven-born gift of artistic design, one could not by examination, or by letters after the name, F.R.I.B.A. or A.R.I.B.A., guarantee the possession of this divine gift. But they felt that the letters F.R.I.B.A. or A.R.I.B.A. after the name of an architect might in a very few years have as much effect in enabling the public to distinguish between a qualified and an unqualified architect as the letters M.R.C.S. and L.R.C.P. had now in enabling the public to distinguish between a properly qualified physician or surgeon and a quack. The founders of the Institute, among whom were well-known men, such as Donaldson, Barry, Decimus Burton, Hardwicke, Parker, and others, with Earl de Grey as first President, when they obtained the charter in the year of the Queen's accession, had a loftier aim, he was sure, than that of founding a trade union. Their object was the advancement in the highest sense of the art of architecture and the glory of the British race. What expressed to us to-day more clearly than anything else the greatness or littleness, the wealth or poverty, the intellect or ignorance, the refinement and culture or brutality and barbarism, of nations that had gone, was the architectural remains that we found existing. If, therefore, the founders of the Institute had the idea in their minds so to encourage the state of architecture, and so to improve the architecture of this nation—this empire—that in the end our monuments should tell the history of our race, and also explain the wealth, the intellect, the refinement that our race possessed, then he said they were acting with the view of enhancing the glory of the British Empire. That, however, was a very high ideal, and it was in the sequel—the wearisome work and endeavour through a long time—that the high ideal appeared all dimly, and that the attainment of such an end seemed very far away. Nevertheless, their Institute had, from time to time, taken steps towards the attainment of this end. They had heard of some of those steps. There was the examination, now compulsory on men seeking to join the Institute and to practise the art of architecture. Her Majesty the Queen also gave a gold medal with a view to furthering the interests of architecture by honouring the men selected by the Institute as the most worthy recipients. Prizes and medals were annually awarded so as to encourage a keen interest in the art among students, and travelling studentships had been instituted with a view to inculcating a lofty ideal among young men. They had papers on all sorts of subjects, ranging from the highest art in connection with architecture to the various branches of science with which it was concerned. The object was to influence architects in the best possible manner with regard to the national importance of architecture, and through the architects also to influence the public, to produce a keen appreciation of the architecture of the country, and through the public to influence the Government of the country and those authorities who had buildings of national importance to deal with. Therefore he thought that when in their corporate capacity they had men who had been brought up with a training fitting them to become members of the Institute, it was right that the chief function of their Institute should be to express with an unfaltering voice its firm opinion on matters connected with architecture of national importance. Whether it was a question of the preservation of our national monuments, or the laying out of new streets and of new districts in the metropolis and our large towns, or the proper disposition of building sites for important structures, or the arrangement of such schemes for providing dwellings for the poor as were mentioned by Mr. Russell, or the attainment of plans and designs for important public and Government work, it was important that their Institute's voice should be heard—all the more important because in this country we had no Office of Fine Arts as they had in France, where architectural subjects were looked into carefully by men competent to deal with them. In this country it was difficult to obtain the assistance or the conjoint work of an architect and an engineer in any important structure. In France, under the arrangements of the Ministère des Beaux-Arts, they were able to do this immediately, and in the new bridge over the Seine architects and engineers worked together. But though architects should advise the public authorities, there was one function that he did not think belonged to their Institute. They had no right to offer to prepare designs or give designs to any public body whatever. That was a matter for arrangement with the right professional men. With regard to the growing influence of their Institute, he was glad to note that the Government had of late years consulted them on a number of important points. In the letter which he had received from Professor Aitchison, announcing his inability to attend, that gentleman pointed out that during his Presidency the Government had done them the honour to ask the Institute to name architects for the new Government buildings in Jamaica, and also for the new Government offices in London; and the Corporation of the City of London had also done them the honour to ask them to nominate architects for the new Central Criminal Court at the Old Bailey. He had no hesitation in saying that the Institute had done much to raise the status of the profession. They had made arrangements by which they had obtained the alliance of important bodies in large provincial towns, and they had even had an application from Johannesburg to join them. From all this they would see that the steps the Institute had taken from time to time, although mistakes might have been made and their efforts sometimes have been abortive, had nevertheless been in the direction of carrying out the idea of the founders, the advancement of the art of architecture, the encouragement of the study of architecture, and the enhancing of the beauty of the public buildings of England. There was one other point which he would like to mention. Owing to the increase of their membership and the extended work of the Institute, their home in Conduit Street had for some years been too small and incommodious. It was certain that they would not be able to carry on the work much longer in that place. Sir John Soane had given £750 for the encouragement of the work of the Institute, but to provide a suitable building would cost a great deal of money. In 1837, when the Institute was founded, there were 170 to 180 architects in London. There were now over 1,400. In the year of the Charter there were eighty-one Fellows and twenty honorary members in the Institute. There were now, in 1899, 1,616 members and 125 honorary members. The Institution of Civil Engineers had managed to build themselves a magnificent home. So had the Surveyors' Institution and the Mechanical Engineers. Of course, architects were a poor race. It was not often they managed to make large fortunes. But he was reminded of a charity sermon preached by Dean Swift, who took as his text, "He that giveth to the poor lendeth to the Lord." "Now," he said, "you are all good Christians enough to be satisfied with the security; therefore down with the dibs." He was sure there must be some wealthy man connected with the Institute and interested in architecture. Supposing they started a building fund, such a wealthy member would surely have faith enough in the security to advance the money. At any rate, it was a subject well worth consideration. They would see if among them they could formulate some practicable scheme which would bring about in the beginning of the new century the beginning of a home for the Royal Institute of British Architects.

Mr. Thomas Drew, R.H.A., President of the Royal Institute of Architects of Ireland, responded on behalf of the Allied Societies. He assured the Chairman of their loyal adhesion to the Institute and to his rule during his year of office. He supposed he was called on to respond because the President of the Johannesburg Society was not present to do so. The accession of allies from beyond the seas showed the tendency to make the Institute—he would not say an Imperial Institute, because that was not a pleasant phrase, but, at all events, a national Institute. The Institute had progressed most successfully through this wise policy of enlisting Allied Societies so as to make the architects of the whole kingdom and of the colonies one. Since the early days he could remember, small jealousies had passed away, provincialism had passed away, and there was good fellowship everywhere. There was no town in which a member of the Royal Institute of British Architects would not find a friend ready to receive him, to give him information, and to correspond with him. Outsiders were not aware of the bond of union that existed among British architects all over the empire.

Mr. J. Macvicar Anderson, F.R.S.E. (*Past President*), said that the toast which had been committed to his care—that of their Guests—he proposed with great pleasure, the more so that it required neither oratory nor argument to commend it. He thought it extremely kind of their guests to accept the hospitality of men who were sometimes, it is true, referred to as artists, but who were not infrequently regarded as a superior sort of bricklayers or educated carpenters! Only the other day, indeed, an eminent artist, who held a prominent position and who was not a hundred miles from the spot on which he stood, published a letter in *The Times* in which he described architects as builders. Now, he confessed to being one of those who had always maintained that whatever else an architect might be, to be worthy of the name he must be an artist. Having, however, had the pleasure of sitting next to the eminent artist to whom he had referred, he had been enlightened by Sir William Richmond as to the sense in which he had applied the word builder to architects—a sense which, he believed, had been misunderstood—and he was glad to have the opportunity of saying, what he honestly believed, that the term was not used in any sense that was derogatory to architects or architecture, but the reverse. It was, indeed, easy to understand that if the description meant one who could not only delineate his conceptions on paper, but could also execute them to some extent in plaster or other materials, it was one which architects might accept in the sense in which it was used—as one of honour. In whatever light, however, their guests might regard them, whether as artists, scientists, or craftsmen, he had great pleasure in heartily welcoming them, and in associating with the toast the name of one to whose words architects might listen with profit as well as pleasure, the Very Rev. the Dean of St. Paul's. A few Sundays since it had afforded him gratification to listen to the "dear old Dean," as he had well been called, reading the Lessons in a voice which, despite his years, was easily heard throughout the vast area of the Cathedral. Long might he be spared to discharge efficiently the high duties of his sacred office.

The toast was responded to by the Dean of St. Paul's in felicitous terms, and the guests shortly after separated.

Members of Council: Compulsory Retirement [p. 446].

Referring to the discussion at the meeting of the 17th ult. Mr. J. Alfred Gotch [*F.*] writes:—

Whatever may be said for or against the compulsory retirement of a portion of the Council every year, do not let us be under any misapprehension in comparing our elections with those of public bodies. It is not, after all, compulsory retirement which is the point at issue, but ineligibility for re-election. It is quite true that on many public bodies, such as urban and rural district councils, the rule prevails that one-third of the members retire every year, although in many cases the whole council retires every third year. The point is that in either case *every member is eligible for re-election.* In our case the whole Council retires every year, and our system is therefore at the present time on all-fours with that obtaining on all popularly elected bodies. But, to continue the analogy, it must be pointed out that the depriving a person of the privilege of standing for re-election is, in the case of public bodies, only resorted to as a punishment for serious malpractices during an election.

NOTES, QUERIES, AND REPLIES.

The Church of S. Donato at Polenta.

From John Hebb [*F.*]—

The church of S. Donato at Polenta, near Ravenna, in the province of Forli, dates from the eighth century, and there is a document in existence, dated A.D. 976, referring to the church. Polenta was the birthplace of Francesca da Rimini, daughter of Guido da Polenta, lord of Ravenna, immortalised by Dante in the *Inferno* (Canto V.), and is said on somewhat dubious evidence to have been at one time the residence of Dante.

A few years ago it was proposed to pull down the church and replace it by a new one, but the Commune of Bertinoro and the province of Forli, in which the church is situate, took measures for its preservation. At a meeting of the provincial council on December 20, 1889, the restoration of the church was strenuously advocated by the illustrious Aurelio Saffi, who in the course of his remarks exclaimed, "What Italian would not desire to see preserved and honoured the church in which Dante worshipped?" The church was scheduled by the Italian Government as a national monument, and underwent a thorough restoration, the expense being defrayed by the Education Department, assisted by private contributions. The work undertaken included the restoration of the roof, the nave, south aisle, and the western apse, and all that remains to be done is the restoration of the apse on the left of the entrance to the church and the rebuilding of the campanile. On reading this description one wonders how much remains of the church where Dante worshipped, and whether it would not have been better to have pulled it down and rebuilt it.

The capitals of the columns of the arcade are, according to Cav. Santarelli, the most important and characteristic parts of the edifice; they are of local stone, some being cubiform and some square (a dadi), and are variously ornamented with conventional foliage, geometrical designs, interlaced ornament, and grotesque figures of monsters and animals rudely executed in low relief.

Certain figures of baboons rather than men, a kind of hippogriff, and a horrible sea crab especially attract attention. Of the castle only a few remains are left, adjoining which is a miserable squatter's hut. Was Dante ever resident at the castle at Polenta? Did he worship in the little church? There is no document to attest this fact, but it is nevertheless not improbable. Tradition, which sometimes errs but sometimes embodies historical incidents, believes in it, and also that Francesca da Rimini resided here; a a cypress which lifts its solitary head on one of the hills and overlooks the surrounding valley, which can be seen at a great distance, and which probably replaces others planted there at different times, is called the cypress of Francesca.

LEGAL.

Architects' Charges: Contract not under Seal.

START *v.* THE WEST MERSEA SCHOOL BOARD.

This was an action in which Mr. Joseph William Start, an architect, of Colchester, sought to recover from the defendant School Board a sum of £473 5*s.* 8*d.* for professional services rendered in having prepared plans and done other work in connection with the enlargement of the schools at West Mersea. The defendants denied that the plaintiff had done the work claimed for. They said that if there was any contract between the parties the plaintiff had not fulfilled its conditions. They also said that the amount claimed was excessive, and set up a legal defence that if there was a contract it was not under seal and could not be enforced against them. The facts, as reported in *The Times* of the 26th June, are as follows:—

In 1897 it became necessary to enlarge the schools at West Mersea, and the plaintiff was interviewed by the chairman of the School Board, and after some negotiations it was arranged that the plaintiff should prepare plans for the proposed enlargement, and that he should act as clerk of the works and superintend the construction of the building. The plaintiff therefore prepared plans, attended various board meetings, and did other work in connection with the matter; but when the builders' tenders came in the defendants declined to carry out the work on the plaintiff's plans on the ground that the lowest tender was for a larger sum than was estimated. Another architect submitted plans, which were accepted, and the building was then constructed. The plaintiff now claimed for the work he had done in connection with these schools. The defendants' case was that it was stipulated with the plaintiff that the total cost of the building to be done was not to exceed £3,000, which was subsequently reduced to £2,000, and the plaintiff was only to be paid in the event of his providing plans of buildings which could be erected at that cost. In that case the plaintiff was to receive $4\frac{1}{2}$ per cent. on the cost of construction, and no more. If he did not provide plans which complied with these conditions he was to receive nothing at all. The plans did not comply with the terms of the arrangement, and so the defendants declined to pay, as they said that they had made no use of them, and had derived no benefit from them. They also said that the plaintiff was asking much more than the $4\frac{1}{2}$ per cent. to which he would have been entitled had the school been constructed on his plans.

After hearing the evidence, the jury found a verdict for the plaintiff for £150, and judgment was reserved.

On the 24th June, Mr. William Graham (for the defendants) argued that the plaintiff was not entitled to recover because the contract was not under seal.

Mr. Jelf, Q.C. (for the plaintiff), said that the jury had found that the defendants had got material benefit from the plaintiff's work; therefore the contract was an executed contract.

Mr. Justice Wills, in giving judgment on the legal defence which had been set up, said that the claim of the plaintiff took the form of an action for services rendered, but there was no express contract to pay for such services. The only real contract between the parties was one expressed in a resolution by the defendant corporation to pay the plaintiff $4\frac{1}{2}$ per cent. on the cost of construction of the buildings to be erected. The action was in substance an action for breach of that contract, which was not under seal. That contract had never become an executed contract, but was an executory one, and did not come within the exception suggested. The learned Judge said that he would have been glad if he could have taken a different view of the case, for the objection that the contract was not under seal was not one with which he could have sympathy. The objection, however, had been taken, and he could not alter the law. Substantially the foundation of this action was an executory contract, and judgment must be given for the defendants with costs, the plaintiff to have the costs of the issues on which he succeeded.

MINUTES. XVI.

At the Sixteenth General Meeting (Ordinary) of the Session, held Monday, 26th June 1899, at 8 p.m., Mr. W. M. Fawcett, M.A., F.S.A., *Vice-President*, in the Chair, with 44 Fellows (including 16 members of the Council), 29 Associates, 2 Hon. Associates, and numerous visitors, the Minutes of the Meeting held 12th June 1899 [p. 458] were taken as read and signed as correct.

The following members were formally admitted and signed the respective registers:—Sir James Dromgole Linton, *Hon. Associate*; George Frederick Bodley, A.R.A., Joseph Smith (President of the Sheffield Society of Architects), Edwin Arthur Johnson, George Augustus Bligh Livesay, Andrew Murray, *Fellows*; Leslie William Green, Frederick Robert Hiorns, Samuel Sebastian Reay, *Associates*.

A letter was read from Sir L. Alma-Tadema, R.A. [*H.A.*], in response to the congratulations of the Institute on his knighthood [p. 481].

The Chairman delivered an Address on the Presentation of the Royal Gold Medal to Mr. G. F. Bodley, A.R.A. [*F.*], who, having been duly invested therewith, replied in acknowledgment of the honour.

A vote of thanks to the retiring President, Professor Aitchison, R.A., for the services he had rendered the Institute while holding the office of President, having been moved by Mr. Aston Webb [*F.*], A.R.A., and seconded by Mr. H. Heathcote Statham, was carried by acclamation [p. 479].

A letter was read from Professor Aitchison regretting that illness prevented his attending the Meeting, and expressing, *inter alia*, his acknowledgments to members for their courtesy and kindness to him during his occupancy of the Presidential Chair.

The Chairman having offered his congratulations to the new President, Mr. Wm. Emerson, who briefly responded, the proceedings closed, and the Meeting separated at 9 p.m.

⁂ By an oversight two or three names were omitted from the list of Scrutineers of the recent elections given in the last number of the JOURNAL [p. 459]. The following is a complete list:—*Fellows:* Messrs. H. O. Cresswell, Percivall Currey, H. Hoyne Fox, Ralph Nevill, J. S. Quilter, Thomas Henry Watson. *Associates:* Messrs. H. A. Collins, H. Hardwicke Langston, F. W. Marks, D. G. Mootham, T. A. Pole, F. J. Potter, H. A. Satchell.

ON THE USE AND VALUE OF COLOUR IN ARCHITECTURE.

BEING THE ESSAY AWARDED THE INSTITUTE SILVER MEDAL 1899.

By Hubert C. Corlette [*A.*],

OWEN JONES STUDENT 1896; INST. ESSAY MEDALLIST 1899.

Illustrated with Photographic Reproductions of Drawings by the Author.

PART II.*

CHRISTIAN ART.—In the course of our inquiry we have hitherto examined only the phases of artistic expression peculiar to those peoples whose national eminence had been attained before the beginning of our own, the Christian era.

Into this later period the examples of those schools of thought which preceded it were carried on. The monuments they produced still remained. We saw to what extent the Greek character had impressed itself upon what is generally known as Roman art—an art which owed its very existence to the ability of the subject Hellenes devoted to the service of their Western imperial masters. The Greek took suggestions from the Egyptian and Assyrian, and developed them, stamping the originality of his own genius, of a pure rational idealism, upon them. These classic results were adopted in turn by the Roman world, and applied to the embellishment of their temples, basilicas, baths, amphitheatres, and other public buildings, as well as to their more modest private houses.

The Romans were a race of builders, engineers, stern administrators, who developed the so-called higher arts but little. They were satisfied to take what they found, the product of a genius foreign to themselves, and apply it as they wished to their own necessary structures.

Christian art progressed in the silence and seclusion of subterranean Rome; but that progress was slow, in spite of the intense idealism of those martyred adherents of what was then called the new faith. They were men who not only saw beauty in the actual objects of the visible world, but, knowing there was a design and purpose covering all things, animate and inanimate, understood there was evidence of a ruling Mind also in the details of every object they could perceive and every act they did. They had been taught, also, more than we perhaps generally suppose, of the spiritual truths symbolised by the everyday realities about them. They knew that the human creature, in spite of what he had become, showed them the Divine Creator, whose every other work, as an indication of His wisdom and power, should—subject to His law, not man's only—be used in His honour. To them not mere words alone, but the works of nature might, by the exercise of man's best artifice, be used as symbols to teach their faith and maintain their hope. There is ample evidence of this in the objects adopted as important features in the design of all early Christian art. They rejoiced that they were able by their works to manifest the sincerity of their belief; they revelled with an almost delirious joy in the glorious powers they were discovering in art, when imperial recognition gave them civil and ecclesiastical freedom. Profiting by the experience of the past, they wasted little time over failures, which would have been certain to overtake them had they contemned what they had the wisdom and modesty to admire.

Eastern.—In the East the progress of Christian decorative art had been more rapid, because more free from the Imperial dictatorship centred in Rome. Those Christians in the smaller cities of Asia Minor were under the Roman civil jurisdiction. But ecclesiastically they were subject to the Eastern Bishops or Patriarchs. The authority given to each Bishop being limited by the extent of his Pastoral Episcopate, extended, originally, no further than to the care of a particular congregation and district—unlike that vested in the Episcopate of the Apostles, which ruled the whole Church. They thus were more directly subject to the influences of the Greek than the Roman spirit in art, religion, and philosophy.

It is to the Christian era that we are most indebted for the best examples of the use of colour in architecture. Its value we shall consider later. During this period we find much variety in the ways adopted for introducing colour, which, though known as colour methods to earlier times, were not so fully developed as during this age. As has been already indicated, tradition in the arts passed on its treasures of experience from an earlier and perhaps decaying school, through vicissitudes with which we are not at liberty to deal, to the schools which followed. Græco-Roman mosaic, fresco, glass, enamel, coloured materials in structure, distemper, plaster, woven and embroidered fabrics, metal-work, examples of these remained to show what had been accomplished

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* *Erratum.*—Part I., p. 463, 1st column, line 8 from foot should read: "In visible art, as in apparent nature," &c. - H. C. C.

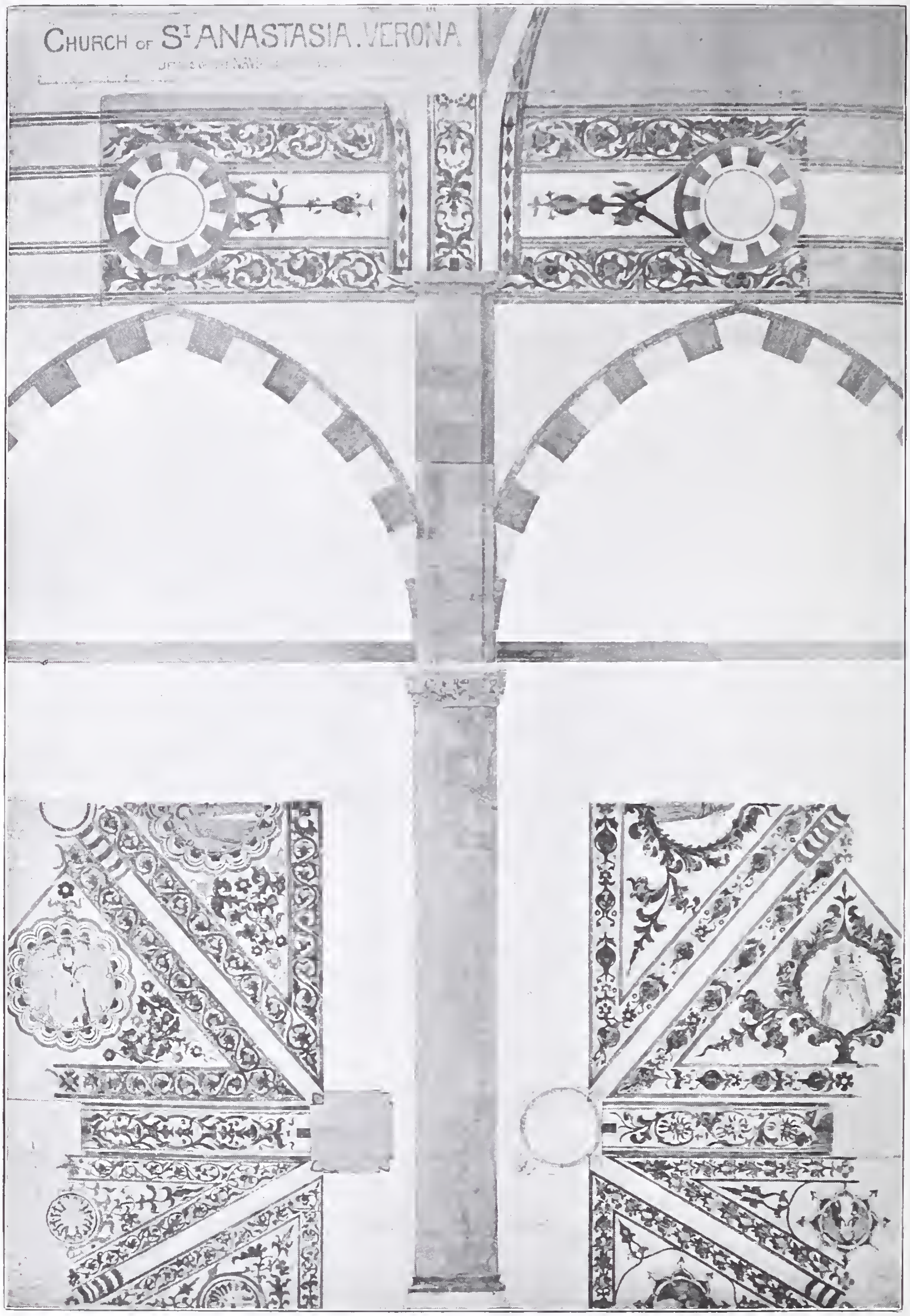
CHURCH OF ST ANASTASIA. VERONA

FIG. 7.—Decoration painted on plaster over brick, 1430-1440. Details of the arcade and vault of nave and aisles. Caps and bases yellow stone, columns red marble. S. Anastasia, Verona.

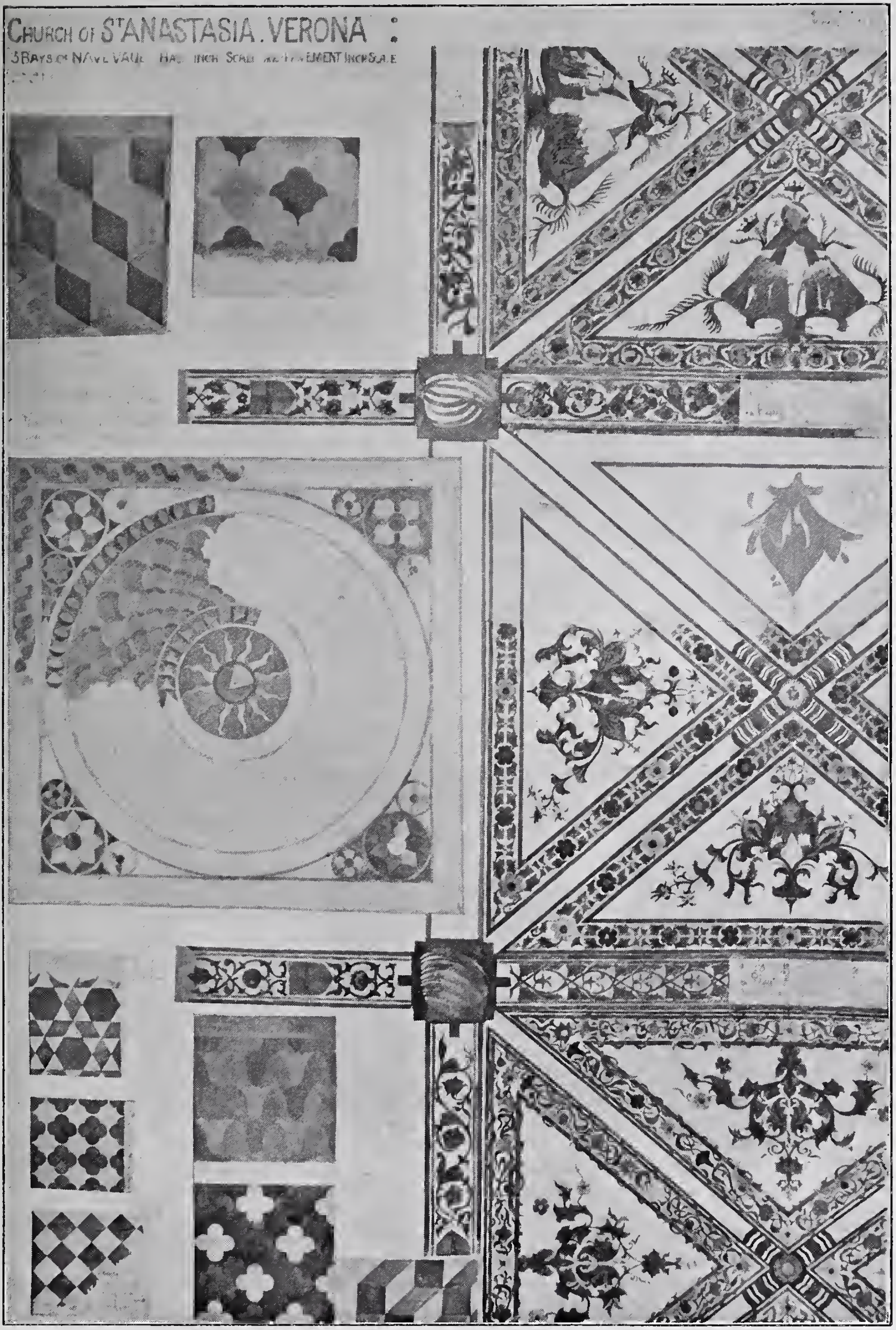
CHURCH OF ST ANASTASIA . VERONA :
3 BAYS OF NAVE VAULT HALF INCH SCALE PAVEMENT INCH SCALE

FIG. 8.—Decoration painted on plaster over brick, 1430–1440. Details of three bays of the nave vaulting, and coloured marble pavements. S. Anastasia, Verona.

and to suggest what further might be done. The discovery of buried scenes has shown us what a Roman city and Greek colony was before a veil of ashes had wrapped it in centuries of death, but not decay.

The Venice we know so well had not yet been founded when Caracalla bought public applause by a patronage of art which debased it as a cover for self-indulgent luxury. Diocletian had encouraged it by satisfying his imperial vanity in causing a palace to be made for him in Dalmatia. Constantine, by transporting his person, had transferred the seat of empire from Rome to Byzantium, and changed its name to commemorate his act. He, the slave, gave freedom to those who had been despised. Already, under Diocletian, there had been some recognition of the growing power of Christianity. So, with the astuteness of a wily fox, Constantine strengthened his own weakness by recognising a power he could not crush, and became the champion of a faith he did not know and to whose heights he could not rise. Nevertheless, when it was freed from political restraint, Christian art experienced under Imperial support an impetus which was soon manifested. But it must be admitted that neither the motive nor the principle asserted when that liberty—right in itself—was given was such as would in the end serve the best interests either of art or the faith it was thenceforward to express. For to them both it became a sacrifice of principle and independence to Royal and popular favour.

Byzantine.—It was during the time of this emperor's domination that the first church in Constantinople, dedicated to The Sancta Sophia, was begun. But the one we know by that name now at Constantinople arose under the protection of Justinian. And in its structure all the best capacity, all the finest material, all the noblest ingenuity of design in that age, were called upon to aid art in one of its highest flights and most exalted aspirations.

In this work the artists engaged by the promoters of the enterprise seem to have realised that man accepted one of his best privileges and highest responsibilities when he attempted and executed true and beautiful design. Man is no god, but he has been endowed, in a degree, with some of the attributes of his Creator, and when he conceives and designs he creates. This he can do, may do, and should do, within his own restricted field. He does this best when he accepts as the fountain to provide subjects for his themes the creation he may see but cannot imitate.

With the structural methods adopted in erecting this most splendid skeleton we are not now concerned, but only with those complementaries to the actual which served to complete an almost ideal body—a fabric which possessed not only the structural features requisite to its perfection, but also the jewels which were able still further to adorn the setting in which they were placed.

Byzantine decorators in colour adopted the glass mosaic method as the chief vehicle by which to express their ideas and aims. This, as well as marble mosaic, had been much favoured by the Romans for introducing colour in conventional decorative design at an early period. And they again used a Roman method in adopting the practice of covering their structure—internally, if not so much externally—with slabs of beautifully coloured marble. When they used metal work of gold, silver, and brass or copper, they no doubt had learned something of its application and beauty from Attic or Ionic examples and tradition. Ivory and precious stones set in metals had been used for the purpose of decoration in works of architecture by the predecessors of the Byzantines in the East. Christian art has used jewels and metals very largely all through its course of growth and decline; and if authority had been required for such a practice it was to be found in the Tabernacle and ordinances given to the Jews to typify things that were to be found in the Church.

At the Church of The Sancta Sophia we find that a gold ground was most favoured by the Byzantines for their coloured mosaics. The same foundation for the bright coloured tesseræ of the decorative figure work, floral designs, and geometric patterns was adopted in other examples. The colours there used for the mosaic subjects in design were glowing and rich in tone, and were selected from a restricted palette similar to that of earlier schools of decorators—red, blue, and gold or yellow, silver or white, and green. Little black appears to have been used. The panelled and bordered work in slabs of marble was not thus limited in the colours selected, as every variety of hue, and veined pattern, that the most beautiful and precious marbles could supply was freely, but judiciously and economically used.

The great dome, the semi-domes, the arches and vaults were all covered with this field of radiant gold studded with the numberless gems designed in brilliant colouring. Monolithic columns of marble were used as parts of the structural or functional decoration, and all the walls of brick were covered with thin applied slabs of marble. Colour was placed against colour in bands of simple contrast, or surfaces of a plain unfigured stone were inlaid with designs and patterns of coloured marble or glass mosaic.

It will be interesting to quote here a short extract from the poem of Paul the Silentiary.* This is a brilliant description written by one who saw the church opened after it had been completed in the sixth century :—

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* See Lethaby and Swainson's *Sancta Sophia, Constantinople*, 1894, ch. iii. pp. 36–44.

> Whoever raises his eyes to the beauteous firmament on the roof, scarce dares to gaze on its rounded expanse, sprinkled with the stars of heaven, but turns to the fresh green marble below, seeming, as it were, to see the flower-bordered streams of Thessaly and budding corn, and woods thick with trees, leaping flocks, too, and twining olive trees, and the vine with green tendrils, of the deep blue summer sea, broken by the plashing oars of spraygirt ship. Whoever puts foot within the sacred fane would live there for ever, and his eyes well with tears of joy. . . . Everywhere the walls glitter with wondrous designs, the stones of which came from the quarries of sea-girt Proconnesus. The marbles are cut and jointed like painted patterns, and in stones formed into squares of eight-sided figures the veins meet to form devices; and the stones show also the forms of living creatures.

In Byzantine decorative art we first meet with a definite scheme of Christian symbolism on a large scale. And in that system we find, shown us in all manner of beautiful designs and colours, those four wonderful figures of the Cherubim, the Lion, the Eagle, the Man, and the Ox, "the Four Evangelists" so-called. They were also represented as the four streams that from Eden flowed, the rivers of waters of life, figuratively set forth by the Pison, the Gihon, the Hiddekel, and the Euphrates. We see these in pavements and find them in nearly all schemes of decoration variously represented. Sometimes they are shown as flowing from a rock.

Paulinus* indicates the existence of a traditional interpretation of this symbol of the streams when he says

> "Christ the Rock
> Of all the Church, the base of rock sustains
> From which as living streams four fountains flow;
> The four evangelists, whose words are gone
> Through every land."

This leads us to a deeper apprehension of the use and value of colour in architecture, so that, if we would understand the meaning of the ideas expressed by the decoration with which the churches of the early and middle ages were covered, we must discover, if we may, the meaning of the symbols then used to clothe the ideas so freely expressed in all the decoration with which those structures were made beautiful.

Western.—It must suffice for our purpose that we have referred to but one example of Byzantine colour decoration as it had been developed up to the middle of the sixth century. Political changes were rapidly taking place in the West where there was, at the same time as in the East, much ecclesiastical controversy to impede the even progress of the arts.

Charlemagne, at the close of the eighth century, took charge of the reins which had so long been directed by Latin hands whose power was gone now that the sceptre had been removed from their enfeebled charge. This new ruler of the West encouraged art, industry, and letters. He promoted to a wonderful extent all the civilising influences he found ready and responsive under his initiating will. He was the Alfred of continental Europe, but his vast realm was divided among his sons, and fell to pieces at last under the weaker rule of lack-incentive minds.

Iconoclastic troubles in the East drove to the West monks and others who had founded schools in which a certain continuity of artistic tradition had been maintained. And it was, no doubt, largely by the influence of such schools that the methods and ideas of earlier designers became so readily available, when they were needed during the revival which followed on the heels of departing ignorance, after the eleventh century had dawned, to the delighted surprise of a misdirected faith.

This was the first Renaissance. And it was the one followed by the best results that the art of Christendom has, till now, experienced. To what our own times may lead us we shall know only when time has unravelled the prospects it has in store.

The Middle Ages.—With the opening of the eleventh century there was begun that movement in architecture which was finally to develop entirely new principles of structure, and a more complete architectural art than any the world had known before. It was now to become an art which allowed the freest and fullest development to all the best that man might conceive, and with it were introduced fresh themes, and new opportunities for their expression. In the period which had intervened since pre-Christian art had been fully cultivated in Greece, we have seen that many interesting changes had been made, not only in structure, but in the use of decorative colour. The Greeks had made but little use of nature as the immediate source of inspiration, except when they used the human form. Rome had attempted to apply the works of her great predecessor to her own needs, and in doing so had not improved what she borrowed in decoration, though she had applied new principles to construction in the arch and the dome. These the Byzantines had accepted, and, in their hands decorative art had sped on to many beautiful discoveries. They had returned to nature for ideas, and found a store that never can be exhausted.

Already there had been schismatic controversy within the Church, and her original unity had long since been lost. Anathema had been cast by the patriarch of Rome against his equal in authority in the east. The Bishop of the old imperial city became the Pope in a divided Christendom, of which he ruled the western part. Then under this new régime art struggled on again. So expecting general destruction at the close of the tenth century, men were surprised when they found the eleventh break on them, and with release from what to them had been a distressing fate, new energy was aroused when hope revived. With revived hope came renewed faith and a fresh vitality in art. Buildings

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* As quoted by Lethaby and Swainson, p. 267, see *ante*.

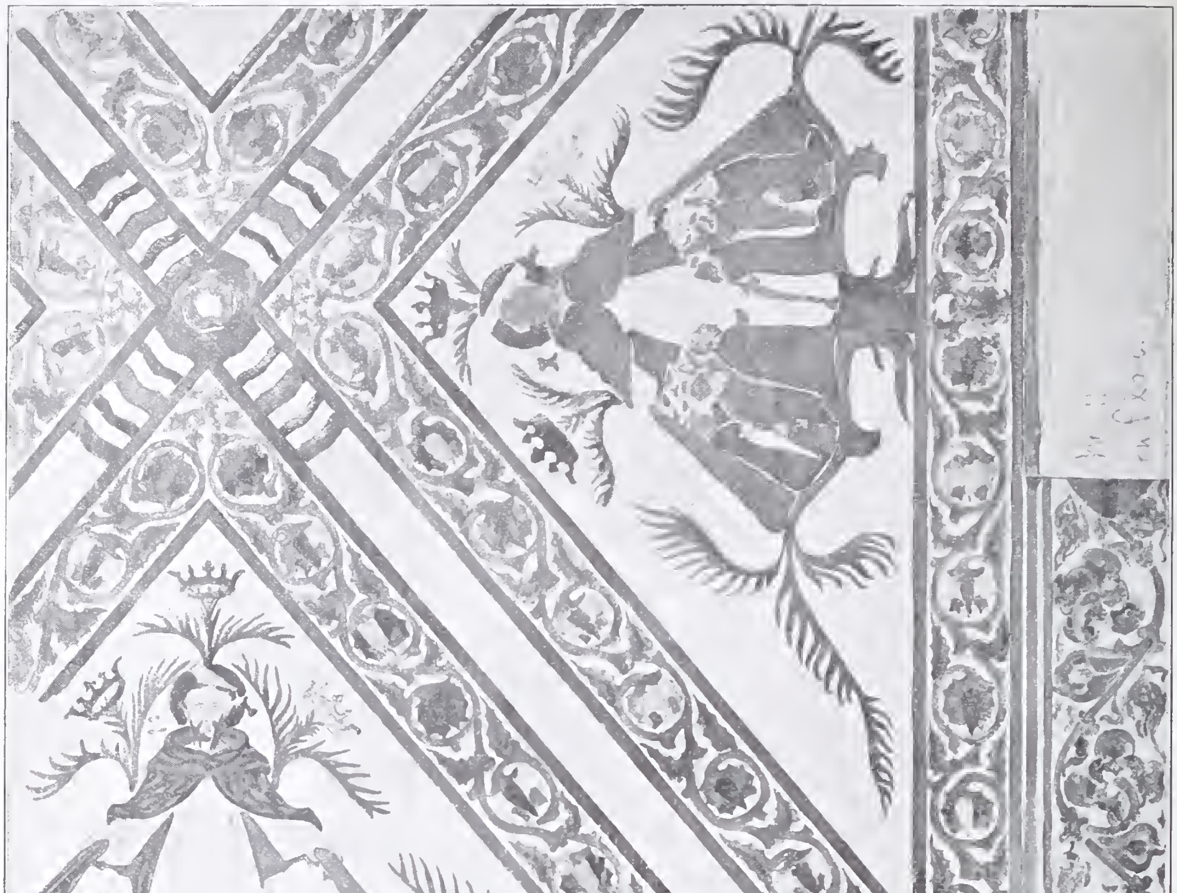

FIG. 9.—Painted Decoration. Detail of one bay of the nave vaulting. S. Anastasia, Verona.

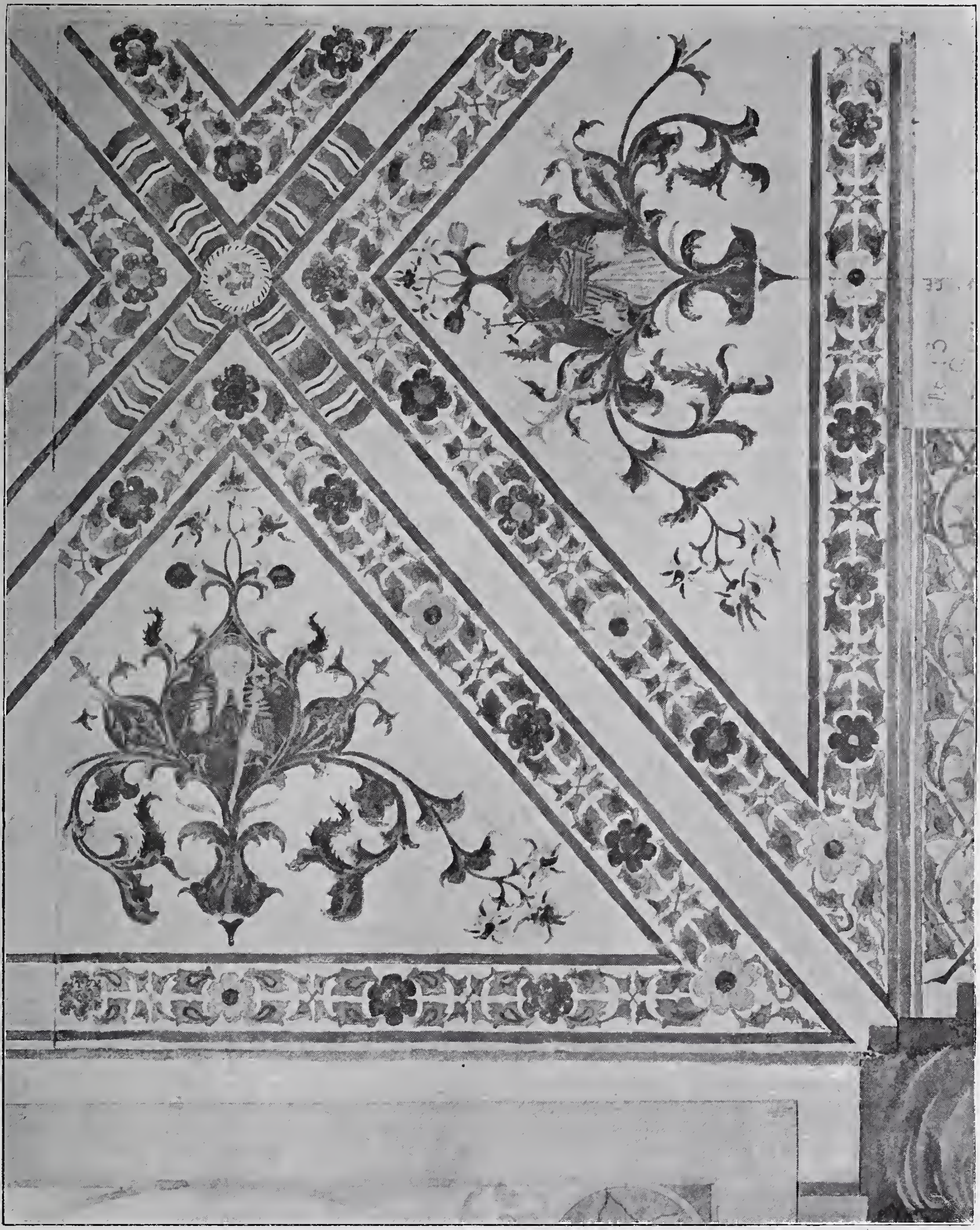

Fig. 10.—Painted Decoration. Detail of one bay of the nave vaulting. S. Anastasia, Verona.

rose in every direction as thank-offerings for an unlooked-for rescue, and they were decorated with all the glories which art discovered when faith gave her new ideas to express. But these were, in reality, the old ideals new-born, though affected by their immediate ancestry.

Let us briefly glance at some results of this revival. The movement was not confined to one part of Europe. It was general. The countries were now, for the most part, peopled with races of untainted vigour. And they applied themselves with forceful energy to all they undertook.

In the fifth century Venice had been founded, and from the eleventh onwards, to the fourteenth and fifteenth, the completion and decoration of the chapel of the Doge's Palace were proceeding. S. Mark's is, as all know, an example of the use of methods like those practised at Constantinople. In this church marbles for the walls and pavements had been used as in the Eastern original, from which the West now borrowed its ideas in decorative colour, and, often, architectural form.

The vaults and domes of S. Mark's are covered with a mosaic of gold. And as was the custom where much mural decoration was used, the windows which lighted them were filled with clear roundel glass of silvery tones. The whole field of the glittering ground is an open volume of the faith of those who worshipped beneath this covering shield. Although the gold ground was a favoured one among the mosaicists, there are examples where blue was used instead. A specimen is found in the tomb of Galla Placidia at Ravenna, where the blue mosaic of the dome is studded with stars of gold, and upon the same field is subject work as well. Flowers designed in colours are introduced upon the arch ribs, which are white. Other examples of the use of this ground in mosaic are known. Its use by painters will be noticed later.

We have dealt with mosaic as used in decoration, and must now pass on to consider the application of other methods and media.

True fresco, it would appear, had been little used from the tenth till about the end of the fourteenth century. But during this period tempera had been adopted as a medium in every direction. And it would perhaps be safe to say that most pictures and decorations that were executed between the dates indicated had been done by this means.

As showing that unity in art already mentioned, an example has been selected from France. It clearly indicates the relation there is between the work of one age or country and another. In it may be found ideas which have been developed from, and can be traced back to, their source in earlier schools of thought. This example was begun in the eleventh and was completed with the decorations in the twelfth century. In this, the Abbey Church of S. Savin, near Poitiers, the building was of coursed rubble-stone, and the decorations were done in tempera on a thick coat of rough hard plaster. The surface had been finished with a thin and finer washed coat to provide a not too porous ground; where the tempera has been protected from the damp, so necessary a precaution with this medium, it shows little sign of decay. The illustrations * will show better than any description those characteristics which have so certainly been derived from mosaic and Greek originals. The decorated columns are suggestive of what had been accomplished in Egypt, and are like what was at the same time being done in other parts of Europe by incised stonework, with or without colour, especially in England. Each column has a different ground tint from its neighbour, and the curved or wavy lines are painted in colours, generally outlined with white. The idea may of course be derived from the use of veined and coloured marbles in the Eastern schools we have noticed.

As was also the custom in mosaic examples, there is little moulded work in this church. All the effects are produced by dispositions of flat bands of colour in red, green, golden orange, and a peculiarly interesting use of white. This last has been distributed in a beautifully decorative manner to separate the bands of different colours. The ground upon which the Biblical stories on the vaults are told was varied. In some parts it was white, in others a green or chrome.

Byzantine mosaic work had already been revived when this painting was done in France, and in the strong and vigorous figure work of the nave vault its influence may easily be found. In the detail of the decorations in the ambulatory there is scroll work in which, traced back through Byzantine inlay, Roman carving, and Greek meanders and frets, we see the Egyptian spiral.

The little church on the hill of S. Miniato,† near Florence, is a beautiful example of the mediæval Italian use of coloured materials. Here they have been applied as surface slabs of black and white marble, and also, in places, they are built in as decorative materials forming parts of the structure. The illustration shows the church as it may be seen from a terrace on the steps leading down to the river valley. With its exterior decoration in coloured marbles, in which are some panels of symbolic and descriptive glass mosaic on a gold ground, the whole stands as a truly beautiful little picture, a jewel set in a sapphire sky. And in the foreground nature is in harmony with art, though not now so fully as in times past. The grey steps lead up to the open piazza before the west front, as they pass on through the fortifications built by Michael Angelo. By the margin of the steps is grass, a brilliant green, and on the intervening walls dark creepers

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* Figs. 1 and 2.

† Figs. 4 and 5.

climb. An old house of red brick on the south side separates the church from the Campo Santo. This warm wall introduces another primary colour to the scene, and completes the law which requires that the trinity of the prism be present in all design with colour. The warmth of sunlight is softened by the cool blue sky, and the black and white, the grey and the grey-green marbles complete the scheme in which the bright tesseræ of gold draw the eyes to the central interest of the composition.

The interior of this church is still further an example of structural and applied colour decoration. The columns—though not all of them—are of marble, the panelling of the walls is the same, and so is the paved floor. The woodwork seats of the choir are inlaid in coloured woods, white and black and brown. The screen wall between the nave and crypt is decorated with geometric marble and glass mosaic inlaid in many patterns and colours. Before this screen stands a marble baldacchino. Rich in material and in structural colour, it is also painted in the particoloured Greek manner. Behind the small altar, under its arched roof, is a reredos of wood, in the panels of which saints and angels are painted in bright colours, drawn with firm lines, standing on the background of dull burnished gold.

A chapel on the north side has a domed vault. The walls are painted in the later and more realistic manner of the Renaissance. But this decoration, though it has some darkness in its composition, is also rich and fine in colouring. In the same chapel is more inlaid work in which red, yellow, blue-green, white and black marbles are used. But it is at the east end of the church that we look for the central idea of the whole design. There, in the semi-dome of the apse, is a gold ground of glass mosaic cubes. Upon this field is Christ enthroned. His hand is lifted in benediction, and about Him are set the beasts of the field, the grass and flowers, and fruitful trees in which the birds of the air build their nests and bring forth their young. Added to these is Man offering his best to his Creator, and by the proffered crown acknowledging a King before all other kings.

This small church, erected during the twelfth century, is selected as an example of its kind, which shows the use and value of colour in architecture. Such master works as the Church of The S. Sophia, Constantinople, and S. Mark's, Venice, are volumes in themselves, to which we need only briefly allude. The mosaic on the semi-dome of the apse, like other good mosaic work of that time, is a representation of natural forms which interpret and teach many beautiful ideas. In drawing it is distinctly conventional, but truthful and good; and in colour it is the same, with rich and full-toned decorative hues, in spite of a little tampering restoration.

Later Middle Ages.—We have seen, in the course of this inquiry, that Egyptian, Greek, and Græco-Roman decorative colourists had used a white ground for their work very largely. The mediæval artists did not confine their tastes to any one particular method. They seem to have realised that all grounds might be used and that all combinations with them were possible, if those who designed in colour line and form knew how to decorate.

In S. Anastasia at Verona * there is a fine instance of the use of a white ground. The work was executed before the middle of the fifteenth century, sufficiently early for it to escape the coming Græco-Roman revival, which destroyed to so large an extent the traditional and sound methods of decorative design.

The medium was tempera, and the material of the ground a thin coat of plaster over the brickwork of the structural forms. The whole treatment of the work is an admirable instance of the application of the principle that decoration should take its leading lines from the structure it covers, and should thus add beauty and expression to the functional members of an edifice. It further illustrates the fact that a simple scheme of colour, coupled with well-drawn detail and a well-designed conception of the whole idea, is quite sufficient to produce the most satisfactory results. An intricacy and loss of breadth by the use of too much colour, or too many colours, is a fault often found in more ambitious but far less successful compositions, even though the design and drawing may otherwise be excellent.

The colour used was green for all the stems and leaves generally, and some of the enclosing bands. Red, orange, yellow, and a very little fresh bright blue were introduced with much care, and, as a rule, in small quantities, to give emphasis to the flowered points of interest.

In the illustrations it will be seen how the work has been done, so far as the conventional patterns and figures have been used in relation to the ground, though the colour is unfortunately not reproduced. The columns in the nave are a pale rose marble, and the caps to them are cream white stone. Thus a little colour is introduced in the essential parts of the structure. But it should be noted that the voussoirs of the nave arches are painted on the plaster. It would have been better to project the bricks of the arch so that they, as coloured materials of the structure, should take their place in the scheme of decoration. The pavements are good specimens of inlaid marble as used for this purpose.

The same church, in some of its furniture and glass, affords examples of the use of colour in relation to architecture, in aspects which, so far, have not been mentioned, and must be reserved for consideration later.

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* See figs. 7 to 11.

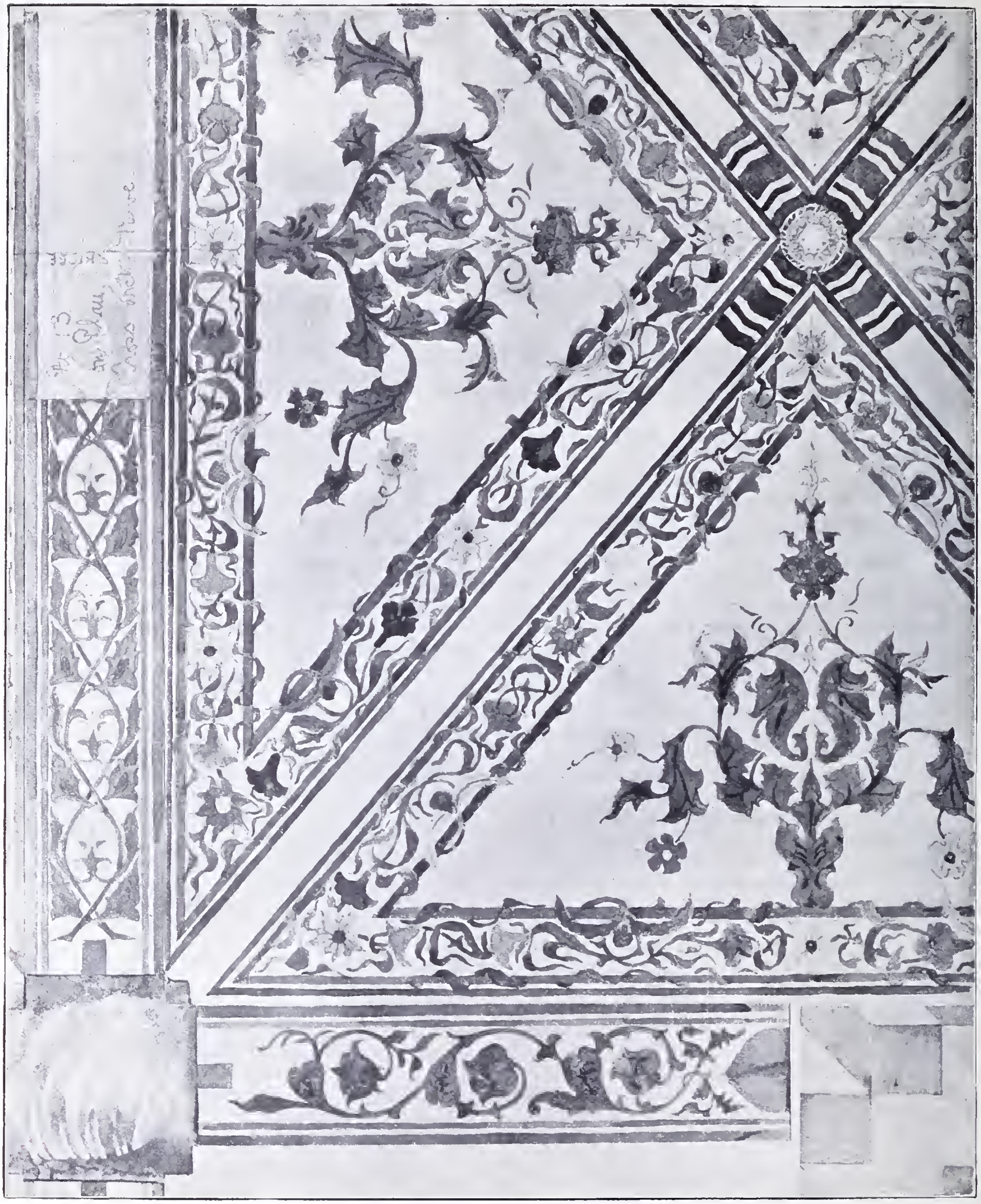

Fig. 11.—Painted Decoration. Detail of one bay of the nave vaulting. S. Anastasia, Verona.

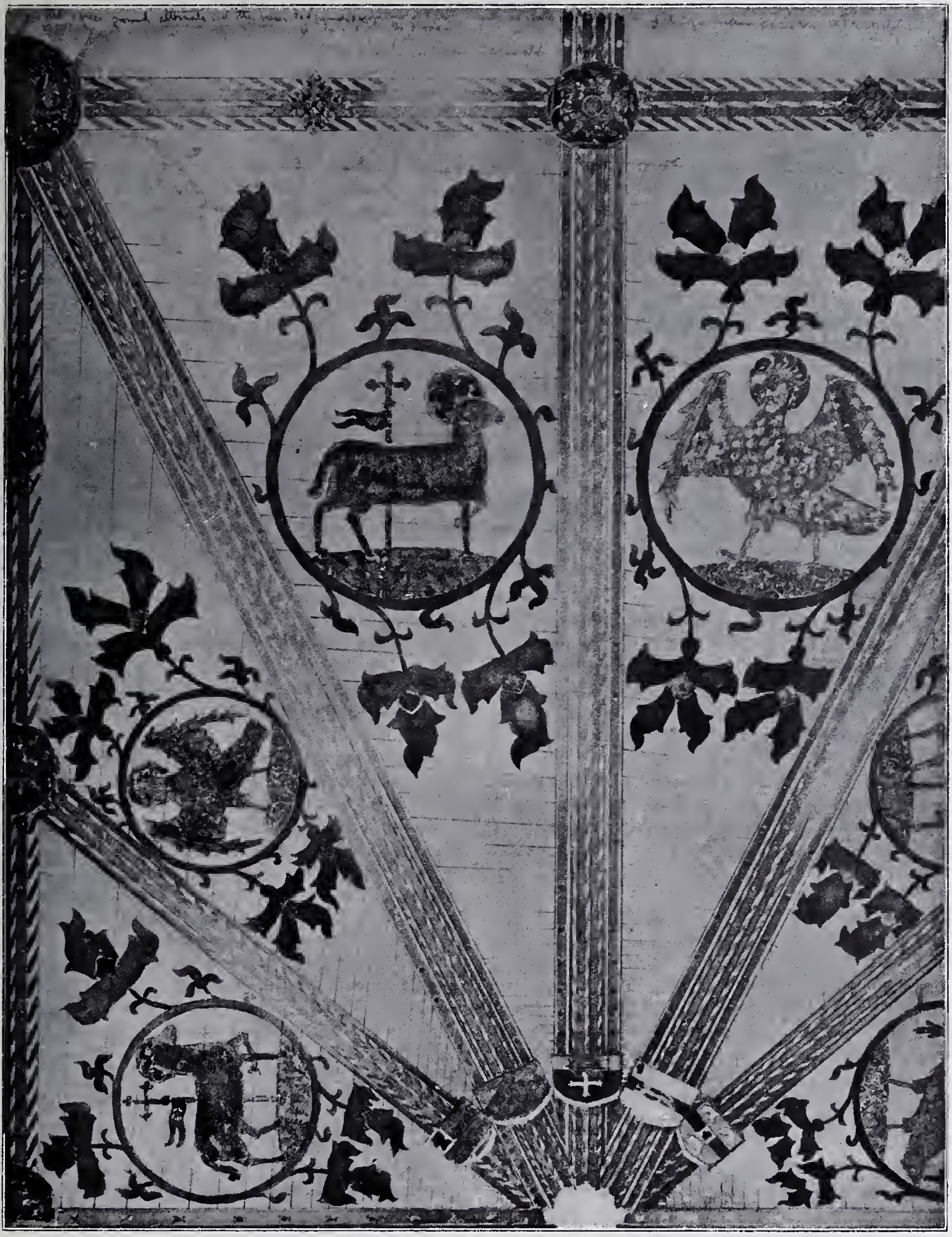

Fig. 12.—Decoration painted and gilded on wood. From the vault of the Sanctuary, S. Albans Abbey.

Structural.—Verona, standing as it does in the midst of Lombardy, introduces a very important branch of the use of colour in architecture. During the Middle Ages, and in fact in the Eastern as well as Western Byzantine work, the habit of using coloured materials in the structure of buildings was much approved. By this means many very beautiful effects have been produced. Coloured bricks, designed in patterns or disposed in variously arranged courses, were used in conjunction with coloured stones, marbles, and tiles. This system of decorating buildings with colour is one by which, most appropriately, the exteriors may be relieved of the needless monotony of one uniform surface of colourless materials. Brightly painted external stone and woodwork or plaster introduces some very effective colouring, but the results of such methods are by their nature, unfortunately, very fugitive.

In this city there are many examples of the kind of work to which reference has been made. But the district supplies many others. At Venice there is the fine façade of the Ducal Palace, interesting both for its colour, detail, and general form, as well as for the story of its design, which tells of prosperous trade with the East, of Crusaders and Saracens, and the subsequent history of the city in its relation to the political and artistic movements on the mainland.

The illustration* of the old Guild Hall at King's Lynn, in Norfolk, shows that, during the fifteenth and later centuries, flint and stone had been used decoratively for structural purposes in England.

This system is surely a most sensible and practical means by which architectural beauty may be obtained in following simple methods. The application of marble slabs externally and internally is admirable for the effects it may produce if it be frankly admitted, by the methods adopted in fixing it, that it is applied and not structural decoration. Either of these methods is, externally, certainly more satisfactory than to paint the outside walls with conventional floral and figure work, as was done in Genoa and in Florence. In Switzerland and elsewhere the same practice was followed, but the result has in the end been invariably the same, for it gradually disappears. Structural decoration has not been studied, practised, and developed to the same extent as applied methods. And with all the many-coloured stones, glazed or plain bricks and tiles, marbles, flints, and woods, there is surely no excuse for its neglect by architects who have any desire to decorate structure by the use of colour in building up architecture.

In approaching the second Renaissance period, we feel the influences it was introducing into architecture and the decorative arts. But, before these latter were finally overwhelmed by the new movement, much beautiful work had been done. There seems to have been a brighter flicker of the once steady flame that was soon to disappear before another fed with fuel foreign to the mind and nature of those men who gave the world the monuments of mediæval days.

We examined one example in Verona. Another, but later one, we find in the great cathedral at Albi in the south of France. This church presents one of the finest instances of the use of colour in architecture by means of applied painted decoration. Its value is inestimable, as it shows so well what has been done, and, it is to be hoped, may soon be as well done again. On the great curved surfaces of the two circular donjons which form the angles of the tower at the west end there is a large and beautifully painted "doom." It was executed early in the fifteenth* century, and is still well preserved. Though it is darkly coloured in some of its parts, wherein it resembles Michael Angelo's treatment of the same subject in the Sistine Chapel, yet, unlike the Italian example, this one is relieved by the use of many decoratively pure tones of colour, such as clear fresh reds, and also with much white. The whole, fifty feet in height, has been painted directly upon the brickwork, with so little preparation—there is no plaster intervening!—that all the brick jointing is visible as a kind of surface texture, very useful in its effects.

But the immense brick pointed vault, with its stone transverse and diagonal ribs, is a field 350 feet long, and 63 feet 6 inches wide, from the north to the south side of the nave. Its great height from the floor, and the enormous expanse, covered from end to end with beautiful colour design, is something seldom to be seen. The ground upon which all the decoration of the vault has been done is blue, like the sky. On this the conventional floral decoration has been designed and painted in white, toned with silver greys. Interspersed amid all this work are bright-coloured groups of figures, some symbolical, and some representing Scripture themes, of course decoratively.

Another interesting feature in this building, of which not too many examples now remain, is to be found in the numerous painted sculptures of important characters selected from the persons named in the Old and the New Testaments, with also some from the Apocryphal books. Four of these are illustrated.† There are many beautiful examples of painted statuettes on the same screen from which these larger ones have been selected.

Though the decoration of the nave vault and the building of the screen had been deferred till so late in the mediæval period as the beginning of the sixteenth century, yet, at such a distance from Italian influence, Gothic art had not yet expired.

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* Fig. 6, p. 475.

* 1400–1410 A.D.

† Figs. 14 to 17.

The blue ground noticed in this church appears to have been a favourite one with the painter decorators from the middle of the thirteenth until the beginning of the fifteenth century. Giotto had used it in the Arena Chapel at Padua, to cite one remarkable example only. The particular works of individual painters like Giotto, Cimabue, Fra Angelico, and others who lived before the Renaissance, are so well known that we need not refer to them. But it is to be hoped that the time has now arrived when in our own day some may be given opportunities to emulate the beautiful examples which such men have bequeathed to us.

In England, as elsewhere during mediæval times, they had treated almost everything in colour. No monument was deemed complete unless it had been thus adorned. The walls of many churches, despite the Puritanic whitewash, give abundant evidence of this. And in further proof some illustrations are given. The beautiful flat painted ceiling of wood in the nave of Peterborough Cathedral is well known. And so is that in the choir of St. Albans Abbey,* a feature of the building which has, so far, escaped the destroyer. Two instances, one from the same Abbey,† and another from Chichester Cathedral,‡ are peculiarly interesting, in that they serve to show the influence of Italian mediæval decorative painting upon work executed in this country. The same type of design as is shown in these latter is also found in two of the churches at Liège. But, apart from the "restoration" to which they have been subjected, these are not so fine as the Italian and English examples.

Many of the open-timbered roofs to be seen in various places, the screens of stone and wood, were also painted in colours. Of the last, one from Norfolk § is selected as an example. Fonts, effigies, chantries, tombs—these too were painted. But to give any further list of instances will be unnecessary. To architects and other artists they are well known, though their example and suggestions may have been far too much disregarded by those whose care should be to preserve them.

During the period between the eleventh and fifteenth century the use of glass as a means of introducing colour into architectural compositions had been largely developed, if not originally discovered. And to its use are applicable the same general principles as those which govern other methods by which decorative art in colour and line is practised. But this medium was one of the most truly beautiful that man had ever used. It was as brilliant in colour as the precious jewels of the earth. It was subject to the most subtle variations of its own inflooded colours, by the changes of every season, and the accidents of every day. Each cloud that moved affected it, every glint of sunshine, each unexpected shower, the morning haze, the midday glow, the evening's softened shades, all these played with its beauties, and whether they frowned or smiled, if its own colouring was luminous and pure, and if the grouped lines of its coloured curves and blackened bars were true in function as well as in design—then its beauty remained always unimpaired. Its technical composition, its origin and history, cannot be considered here. These are matters for a text-book and not for a pleader's notes.

In the use of glass it should be observed that deep-toned colours, with little white admitted for relief, must be carefully used in latitudes where light may not be spared. And where the light is full, penetrating, and strong, the deeper the tones the greater is the comfort and delight they may afford. It is desirable that windows in either a church or civil building should be not only connected with each other by the theme of which

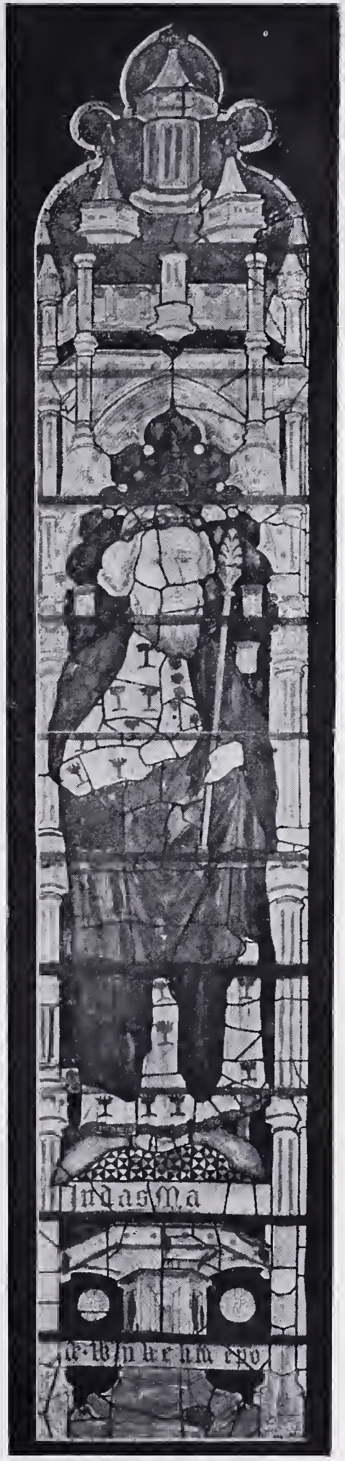

FIG. 13.—Stained Glass Window, 14th century. From the Ante-Chapel, New College, Oxford.

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* See fig. 3, p. 469.

† See fig. 12.

‡ See fig. 19, Part III.

§ See fig. 18, Part III.

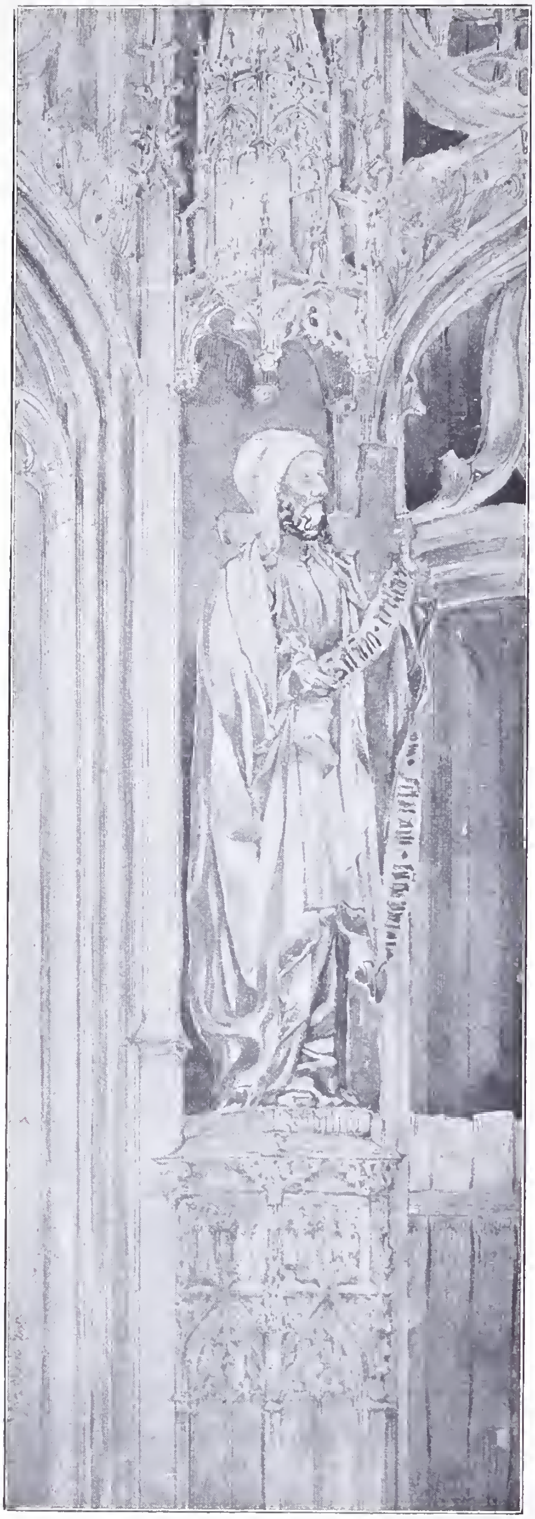

FIG. 14.—S. Philip. Painted Sculpture, 1470-1500.
Albi Cathedral.

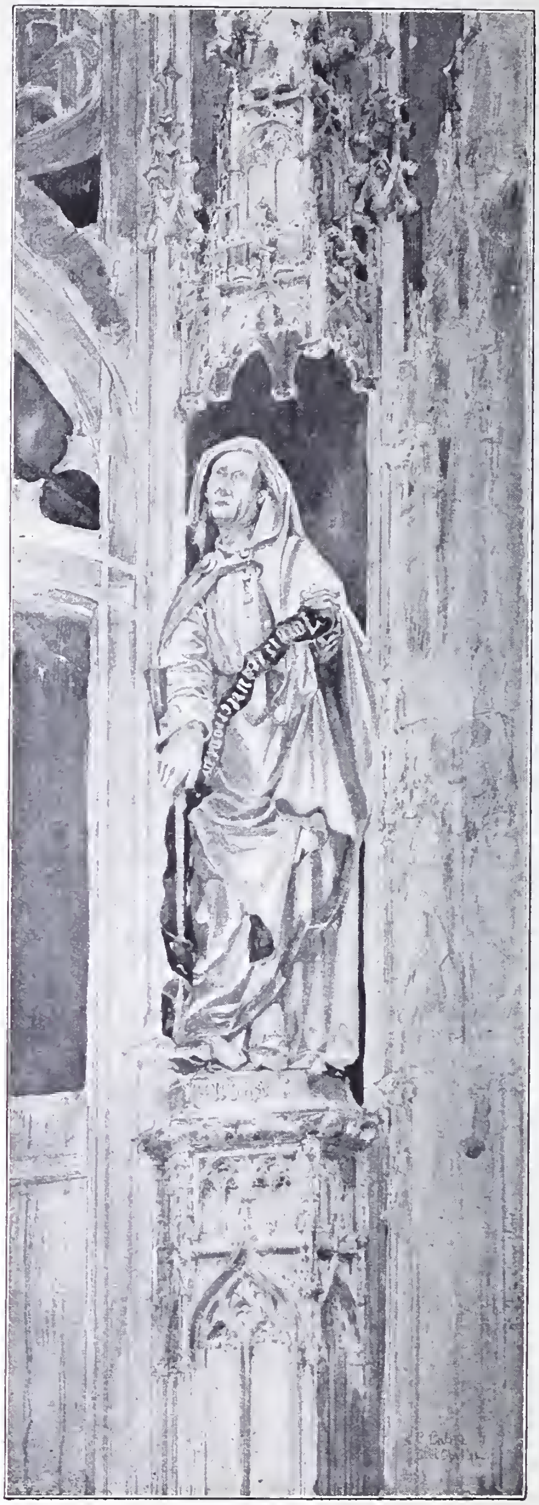

FIG. 15.—S. Jude. Painted Sculpture, 1470-1500.
Albi Cathedral.

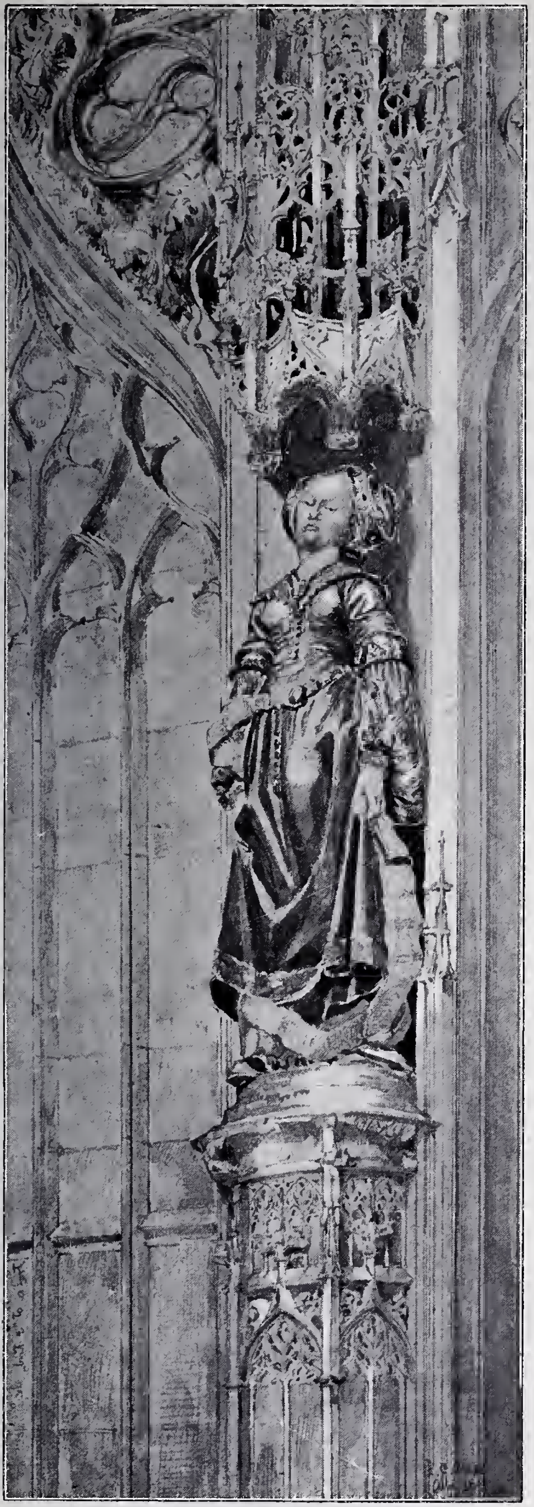

FIG. 16.—Judith. Painted Sculpture, 1470–1500.
Albi Cathedral.

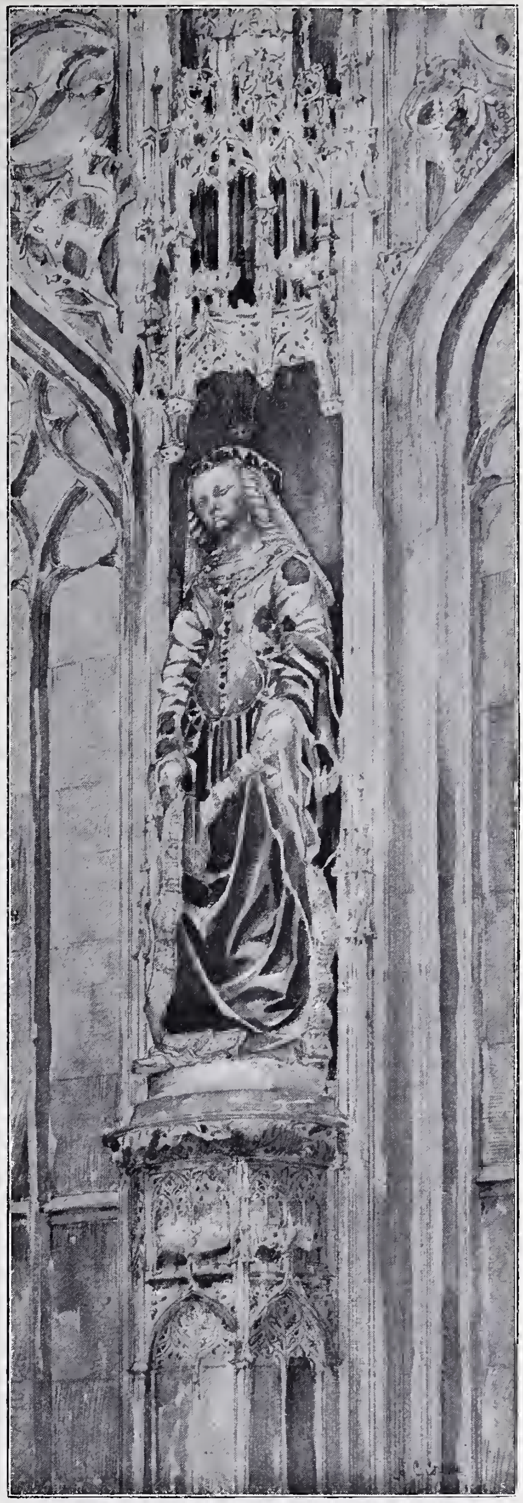

FIG. 17.—Esther. Painted Sculpture, 1470–1500.
Albi Cathedral.

they are the exponents, but that they should, above all things, be subject to the control of one mind which has before it the result of a whole scheme of decoration when all its parts shall be complete. Then, and only then, can there be unity in the whole idea, harmony in the related lines, and proper interdependence, due prominence and subordination, given to the various other media that have been employed. And this is a principle applicable to any composition in art, whether it be of decorative design in colour or of some great poem of sound. In architecture it is applied to govern the subordinate relations of all things to a leading idea focussed by the chief feature of the whole. By its observance we acknowledge the dependence of detail on mass; of drawing and colour on the type of the whole composition; and of the general treatment, in form and size, on situation. The parallel of the principle in militarism we need not urge, for it is obvious; so in fact is it in all things, from the family unit to the head of a state and the Divine Head of the Church. But in art, forsooth! it has been supposed that unity in design may be obtained by an anarchy of clamouring ideas.

No man need travel far to see some of the best glass the mediævals ever produced, yet every day feeble attempts at imitating these works of genius are put forth with no apology either for ignorance or incapacity. The examples in Oxford* and Cambridge alone are an education in the design and craft of glass-work. And in Chartres, to name only one place which may be reached by a day's journey from London, are things to fire an imagination and shame the creative powers of those who love and would design in colour.

The figured work in glass was variously treated in different periods. The human form, suggestions from plant life, or combinations of geometric lines—these were used upon fields of ruby, gold, and blue, or silvery white. The peculiar characteristics of glass design, early and late, are separate subjects in themselves, and must of necessity be disregarded in this survey. Nevertheless, it is necessary to add some particular remarks affecting the general principle under review. The use of coloured glass in decorative compositions should be restricted to the use of stained glass. It should not be painted in imitation of a picture. Nothing could be worse in this respect than the Munich glass which has from time to time been introduced into England. Some in the chapel at Peterhouse College, Cambridge, and those in the body of the chapel of New College, Oxford, are excellent examples of what should be avoided.

As a specimen of English work of this class, there is the west window of the ante-chapel in New College. In the *Sir Joshua Reynolds' Notes*,† published by Cotton in 1859, a fragment of Mason's MSS. tells us that "with the copy Jervas made of this picture he (Sir Joshua) was grievously disappointed. 'I had frequently,' he said to me, 'pleased myself by reflecting, after I had produced what I thought a brilliant effect of light and shadow on my canvas, how greatly that effect would be heightened by the transparency which the painting on glass would be sure to produce. It turned out quite the reverse.'" In this is an excellent opinion upon the method that has been condemned.

Heraldry has been used with excellent results in stained glass and other compositions, because it calls for purity of colour and a simple treatment, both of which are essential in this medium, as in others we have named.

SARACENIC.—In the seventh century of our era Mecca and its surrounding sun-scorched plains were the scene of deeds, then apparently of little import, which were to affect the whole of European development seriously for centuries. The movement then begun rapidly extended its influence, till we find the Saracens making raids upon Europe's forbidden preserves. But, in spite of the Crusades, they ultimately prevailed; Constantinople fell to their share, and, like locusts from the south, they attempted to spoil the good things they found. Charles Martel had driven them back finally from France. But they left behind them some impressions on the arts of Southern Europe. The Visigoths could not displace them from their fast holding in the South-West for many a day.

At Granada and Cordova they stayed till Ferdinand and Isabella expelled them. But this was not before they had founded academies and established schools of thought. Their patronage of learning, unlike modern favours of a similar kind bestowed by "enlightened" nations, such as our own, had included a most careful foster-fathering of the arts. Out of this policy soon grew some of the finest flowers of coloured imaginings that man has seen.

The Saracens had used plaster very much as a ground for colour, and developed the application of geometric forms as a means of decorating. Inlaid work, stained glass, and glazed materials they also used with much ingenuity and beauty. They had adopted the bright pure colours which tradition and inclination prescribed as always necessary in decorative art. Their own works had been influenced by contact with Byzantine design, and Christian art, chiefly by means of the Crusades, had on the whole borrowed from them.

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* See fig. 13.

† See Ruskin's *The Two Paths*, Appendix II

To be continued.

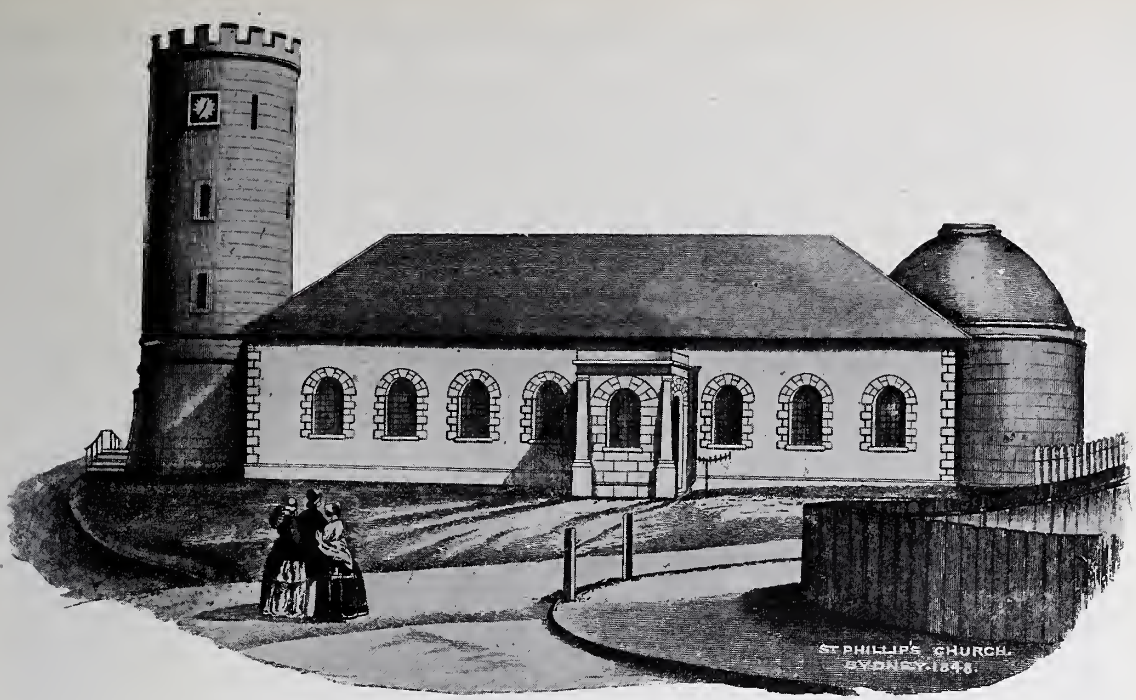

ST PHILLIP'S CHURCH.
SYDNEY. 1848.

FIG. 1.—THE FIRST CHURCH IN AUSTRALIA. DEMOLISHED IN 1856.

ARCHITECTURAL WORK IN SYDNEY, NEW SOUTH WALES, 1788 - 1899.

By James Barnet [*F.*], of Sydney, N.S.W.

IN far New Holland, when George the Third was King, 111 years ago, Captain Arthur Phillip, R.N., with his fleet of eight ships, on the 18th January 1788, anchored in Botany Bay. Its shores, however, were soon found to be unsuitable as a site for settlement; so search was made along the coast for a more favourable position, and the fine harbour of Port Jackson was presently explored. On the 24th of the same month the first colonists landed on the then lovely sandy beach at the mouth of a fresh-water stream, in what is now known as Sydney Cove. Then they began building their huts and store-houses in the heat of summer, to shelter the thousand odd pioneers of the infant commonwealth of Australia. The artificers and ships' carpenters went to work under the direction of Lieutenant Dawes, an engineer officer, and on the 15th May 1788 the first stone of a temporary Government House was laid. This was followed by the erection of a wooden church, built at the expense of the Chaplain, the Rev. Richard Johnson, which unfortunately was afterwards destroyed by fire.

In July 1793 (five years after the foundation of the Colony) the first stone of a church dedicated to St. Phillip was laid by the Lieutenant-Governor, Major Francis Grose. This very interesting structure might be regarded as the dawn of architecture in Australia. Its architect is unknown, but little doubt exists that the Chaplain was the prime mover, and perhaps Lieutenant Dawes assisted, although he left the Colony before the building was commenced. It was erected on the brow of what is now known as Church Hill, and the chancel was a semicircular structure, standing towards the north-west, and at the south-east entrance a battlemented round tower was erected; also a porch on the north-east side. This church was not consecrated till 25th December 1810 (the first Christmas in Governor

Macquarie's time), but it had been used as a place for public worship since 1797. In 1803 King George the Third presented a silver communion service, which is still in use. The accompanying photograph [fig. 1], which is from a sketch by the late Mr. Joseph Fowles, teacher of drawing in the National schools, shows the architecture of this the first church in Australia. The structure was pulled down in 1856, having been in use more than sixty years. The site on which it stood is now enclosed and planted, and is used as a place of recreation.

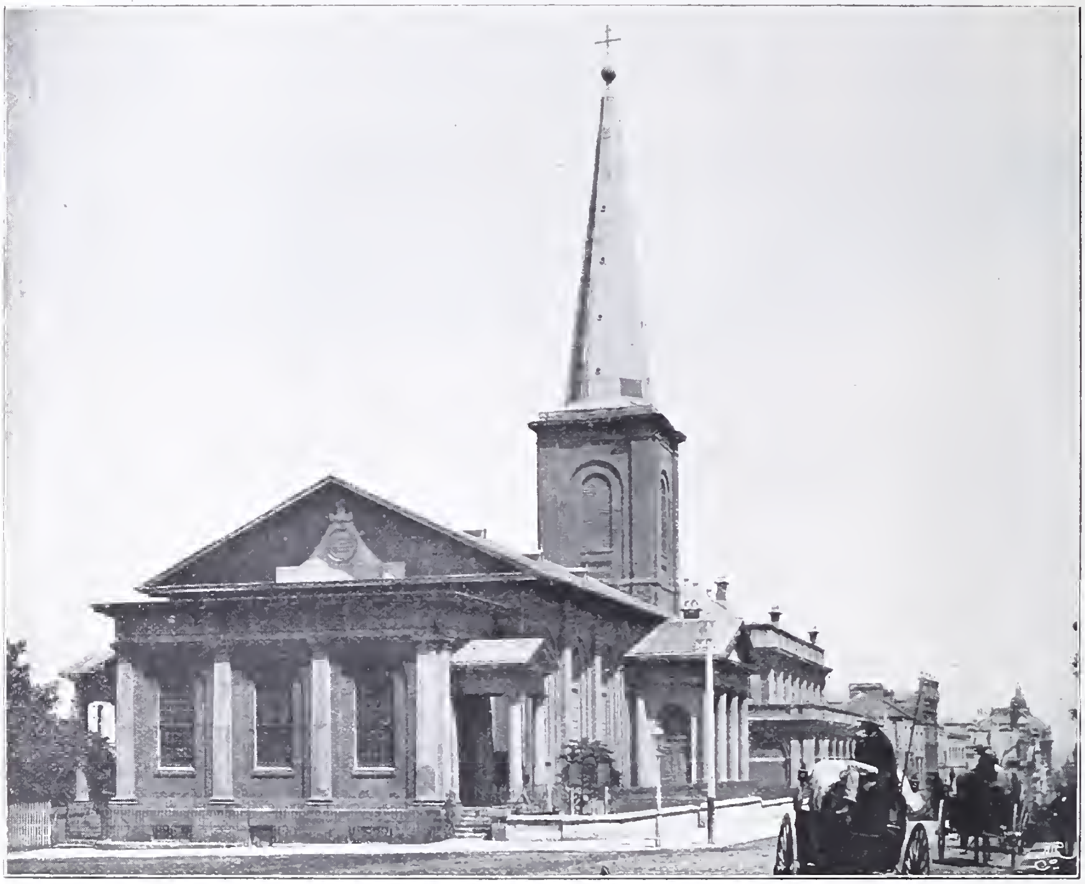


FIG. 2.—ST. JAMES'S CHURCH, SYDNEY

The Church of St. James, in King Street, was the second church built in Sydney. It was completed in 1820, in the tenth year of that mighty builder, Governor Macquarie. The architect of this church, and also of the churches at Windsor, Richmond, Parramatta, and Port Macquarie, was Francis Howard Greenway, civil architect, who also was architect of schools, courthouses, hospitals, barracks, and the first lighthouse in Australia at Sydney Heads, Port Jackson. St. James's Church is a fine structure of brick, with stone dressings, having porticoes with Doric columns, and pediments of Roman character, campanile of brick, with spire of wood covered with copper—a very conspicuous object and a landmark. It has recently been restored, and one of the porticoes opened out, but unfortunately broaches have been added to the base of the spire, thus changing the original appearance and the architectural character. The photograph [fig. 2] was taken before these alterations.

In 1820, on the 19th October, Governor Macquarie laid the foundation-stone of St. Mary's Roman Catholic Cathedral. The architect is unknown; the style of architecture was, as then known, the Gothic of Batty Langley. This building was destroyed by fire, and a temporary pro-cathedral took its place pending the completion of the fine decorated Gothic structure now being built, which will be the permanent cathedral.

A Presbyterian church was built on Church Hill in 1824, also St. Patrick's Roman Catholic Church in 1844, the latter a decided advance in architecture; and in 1849 was begun St. Phillip's new church at the top of the hill, a little higher up than where the first church stood, from designs by the late Edmund Thomas Blacket, architect. It is in the perpendicular Gothic of the fifteenth century, and was finished in 1855, at a cost of £16,000. It is built of sandstone outside and inside, with nave, aisles, and chancel, having a fine western tower with lofty pinnacles, telling well in the picturesque outline of the city. In 1857 St. Benedict's Roman Catholic Church in George Street West was built, the late William Munro being architect; in 1859 St. George's Presbyterian Church in Castlereagh Street, by Mr. Field, the successful competitor; and in 1863 St. John's Church of England at Darlinghurst, by the late Mr. Gould, architect, the spire being by Mr. E. T. Blacket.

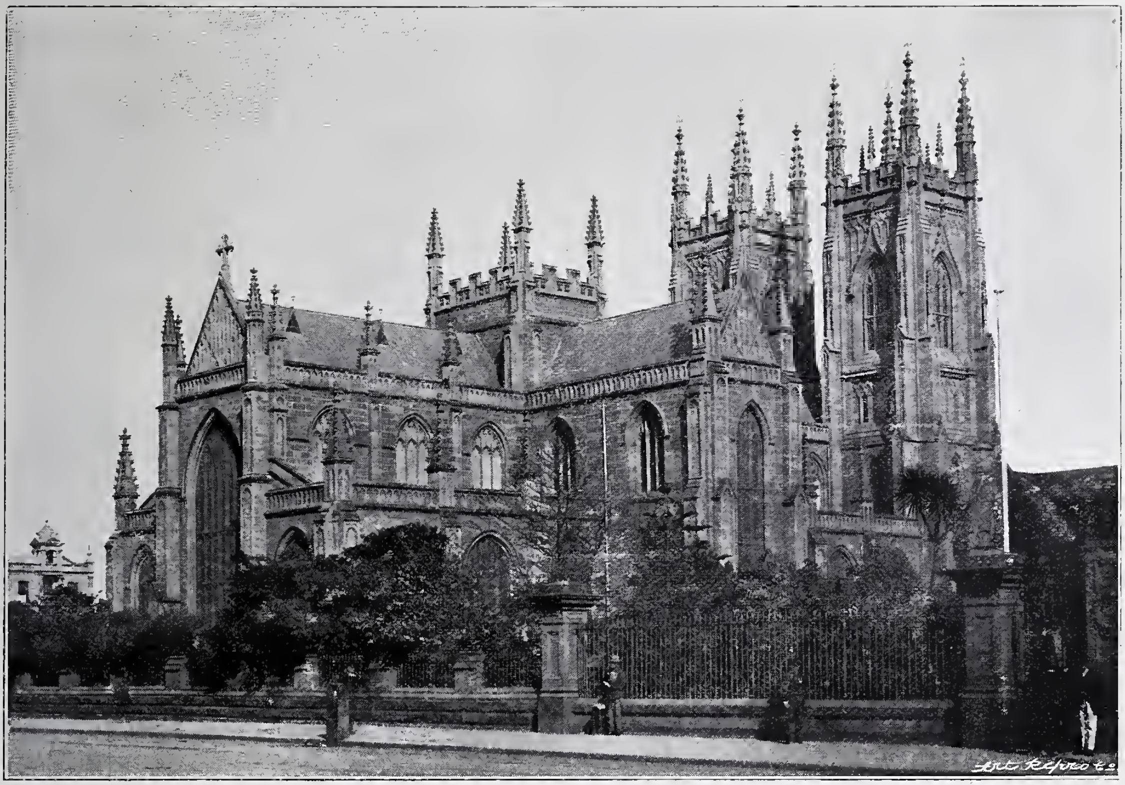


FIG. 3.—ST. ANDREW'S CATHEDRAL, SYDNEY.

St. Andrew's Church of England Cathedral in George Street [fig. 3].—The first stone of this Cathedral was laid on the 1st September 1819 by Governor Macquarie. Francis Howard Greenway was the architect; but his design was abandoned, and a new one based on St. Mary's, Oxford, was adopted in 1837. The first stone of the newly modelled building was laid by Governor Bourke after the appointment of the first bishop, Broughton, and the late James Hume was the superintending architect. Little progress, however, was made till 1846, when Mr. E. T. Blacket was employed to re-model the design, which is perpendicular Gothic of good character. The nave is 157 feet by 26 feet; aisles, 17 feet; and narrow transepts, 14 feet 7 inches wide, with two fine western towers and squat central tower, recalling somewhat to memory features of both Canterbury and York Cathedrals. The cathedral will accommodate 1,500, the seating is of oak in good design, the reredos of alabaster by the late J. E. Pearson, R.A., and the building of sandstone throughout. A chapter-house in keeping with the cathedral was added in 1886, Mr. Blacket, jun., being the architect. Altogether the entire structure, with enclosed garth, from an architectural view is both pleasing and appropriate. It was consecrated on St. Andrew's Day, 30th November 1868, the Duke of Edinburgh being present on the occasion.

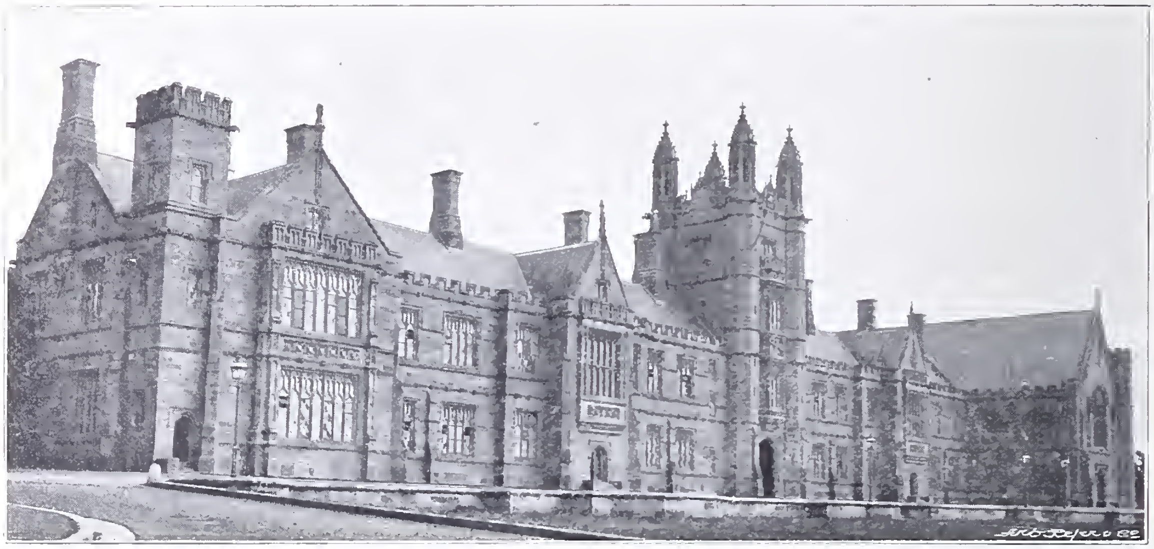


FIG. 4.—THE UNIVERSITY OF SYDNEY.

In 1839, a Wesleyan chapel of good classical design was built in York Street; Mr. Josiah Atwool, architect. The late Thomas Rowe also designed Wesleyan chapels in Redfern and Woolloomooloo and elsewhere, as well as Presbyterian and Roman Catholic churches, of Gothic character, and much merit, in a style individual to himself. He was also very happy in a synagogue design. There are several Congregational churches by the late John Bibb, architect, all possessing good classical features.

St. Mary's Roman Catholic Cathedral, now in course of erection, is in fourteenth-century Gothic, reminding one somewhat both of Lincoln and York Cathedrals. The northern or sanctuary half of the nave has been in use for some years; the central tower and southern nave and transepts are now in progress. The building, when complete, with its towers and spires, will be an ornament to the city, an honour to the Roman Catholic community, and a lasting credit to its architect, Mr. W. Wardell.

The discovery of gold in 1851 brought a great increase in population and wealth to the Colony, when far-seeing patriots, including the late W. C. Wentworth, the present Sir Charles Nicholson, F. L. S. Merewether and others, founded the Sydney University [fig. 4], and, in 1854, engaged Mr. E. T. Blacket as architect to prepare designs suitable for the fine commanding site granted on Grose Farm. The style chosen was his favourite fifteenth-century or Tudor perpendicular Gothic, built in sandstone, with central gate tower, great hall and many lecture rooms, historical museum, &c. The great hall of convocation is 135 feet by 45 feet, with fine open roof of ironbark and cedar timber; the floor is of native marble; it has fine stained-glass windows showing the kings and queens of England, founders of colleges at Oxford and Cambridge, and portraits of men of letters and science, from Chaucer to Captain Cook, all of which are gifts from enterprising colonists. The building was opened with a musical festival of a week's duration in 1857. Thirty years later (in 1887) the Medical School adjoining [fig. 5] was built in the same style of architecture, with many fine lecture theatres for anatomy, physiology, and other subjects, and a museum and laboratory fitted with all the latest appliances. There are also separate buildings for chemistry, physics, engineering, biology, and a large Natural History Museum.

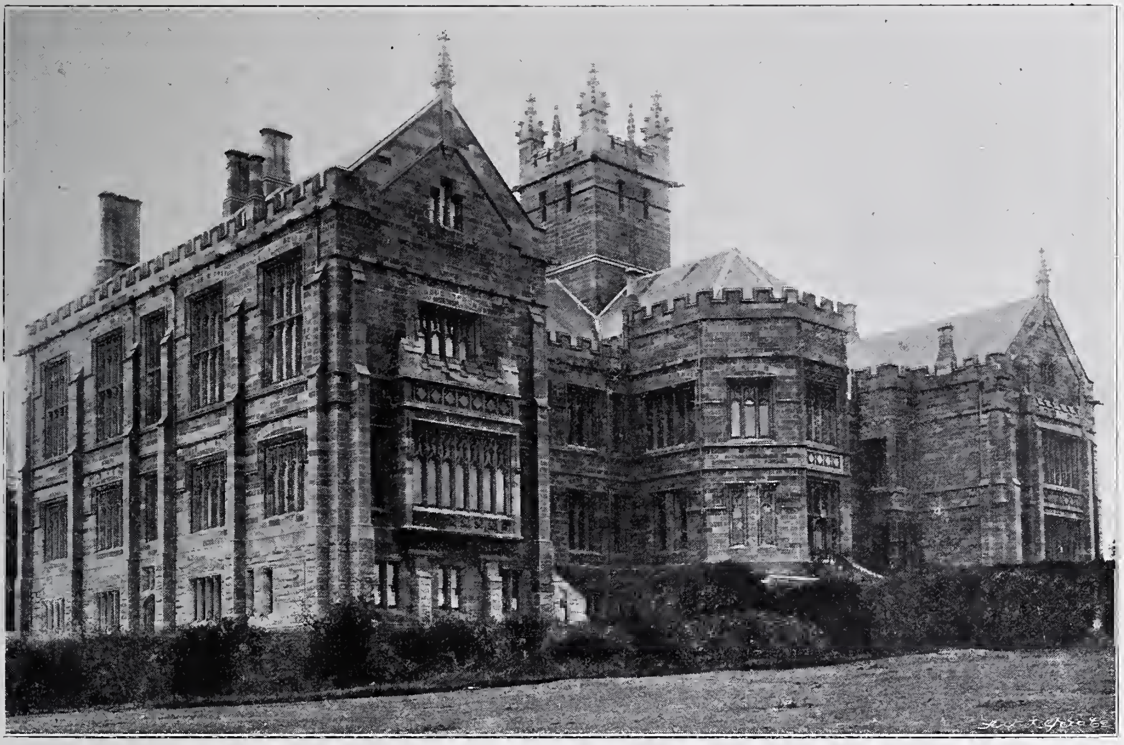


FIG. 5.—MEDICAL SCHOOL, SYDNEY UNIVERSITY.

Surrounding the University are the affiliated Colleges of St. Paul, C.E.—Mr. E. T. Blacket, architect, built in 1857; St. John's R.C. College, built in 1862; St. Andrew's Presbyterian College—the late William Munro, architect, built in 1872; and the Women's College, erected in 1890. The first three are of Gothic architecture, built in sandstone. The latter is built of reddish bricks and tiles, and is Italian in character. Adjoining is the Prince Alfred Hospital, a building of thoughtful design, constructed of buff-coloured brick with stone dressings, and provided with the latest and best appliances. The building was erected to commemorate the escape of the Duke of Edinburgh from an attempt upon his life.

The Sydney Hospital in Macquarie Street [fig. 6] is a fine structure of Italian architecture, and is built of sandstone. It was the result of a competition in which the late

Thomas Rowe was successful. This edifice takes the place of the original Sydney Infirmary, the work of the civil architect, F. H. Greenway, in Governor Macquarie's time.

There are many public schools of recent erection in various styles. The earliest, erected in 1815, is in Fore Street [fig. 7], designed by Greenway for a hospital; but perhaps the greatest effort in building by the Department of Public Instruction is the Technical College and Museum in Harris Street, Ultimo. It is Romanesque in style, built in reddish brick with stone dressings, and is the work of the late W. E. Kemp, for many years architect of the Department.

The Town Hall [fig. 8].—Designs for this important building were called for by public competition, and the late Mr. Wilson was the successful competitor. In 1868 the foundation-stone was laid by the Duke of Edinburgh. On Mr. Wilson's death, and before the completion of his design, the late Mr. David McBeath, and the late Mr. Sapsford, architects, were engaged in this work; three other architects also were employed before its final completion in 1889; so that twenty years were occupied in building. Since then a carriage porch has been added. The main feature is the Centennial Hall, 166 feet by 85 feet, with a seating capacity of 4,000. There are besides a large vestibule or subsidiary hall, spacious corridors and stairs, council chambers, library, Mayor's reception rooms, offices for the Town Clerk and his subordinate officers, &c. The style of architecture is florid Italian Renaissance, built in sandstone.

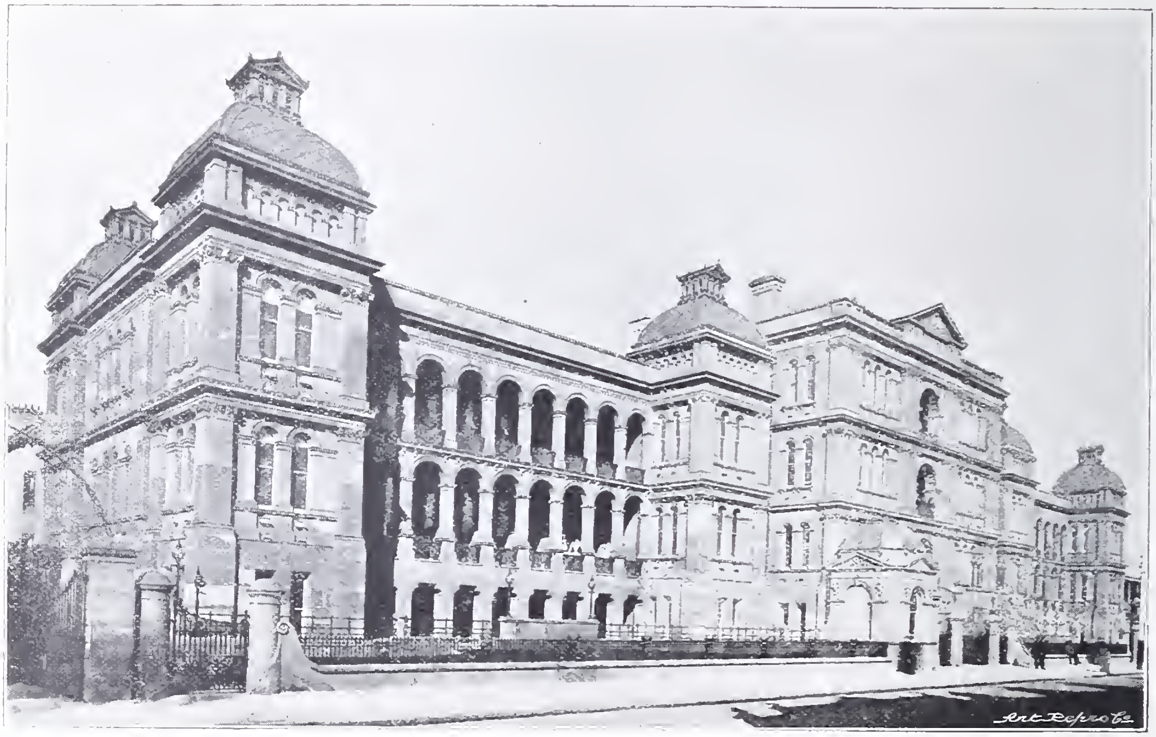


FIG. 6.—SYDNEY HOSPITAL.

Adjacent to the Town Hall is the new Queen Victoria Market building, recently erected. It occupies a space of some 600 feet by 100 feet, having a spacious basement intended as a market hall for the sale of fruit and vegetables. On the ground floor, on the level of the four surrounding streets, are many shops having frontage to these streets, and also to an inner arcade. On the floors overhead are halls for music, meetings, public lending library and offices, also an hotel. The whole is surmounted by many domelets, and one central dome about 60 feet in diameter. The style of architecture is florid Romanesque; it is built of sandstone on iron girders, supported on trachyte piers. There are several other halls for public concourse, such as the Freemasons', Oddfellows', and the Wesleyan Centenary Hall.

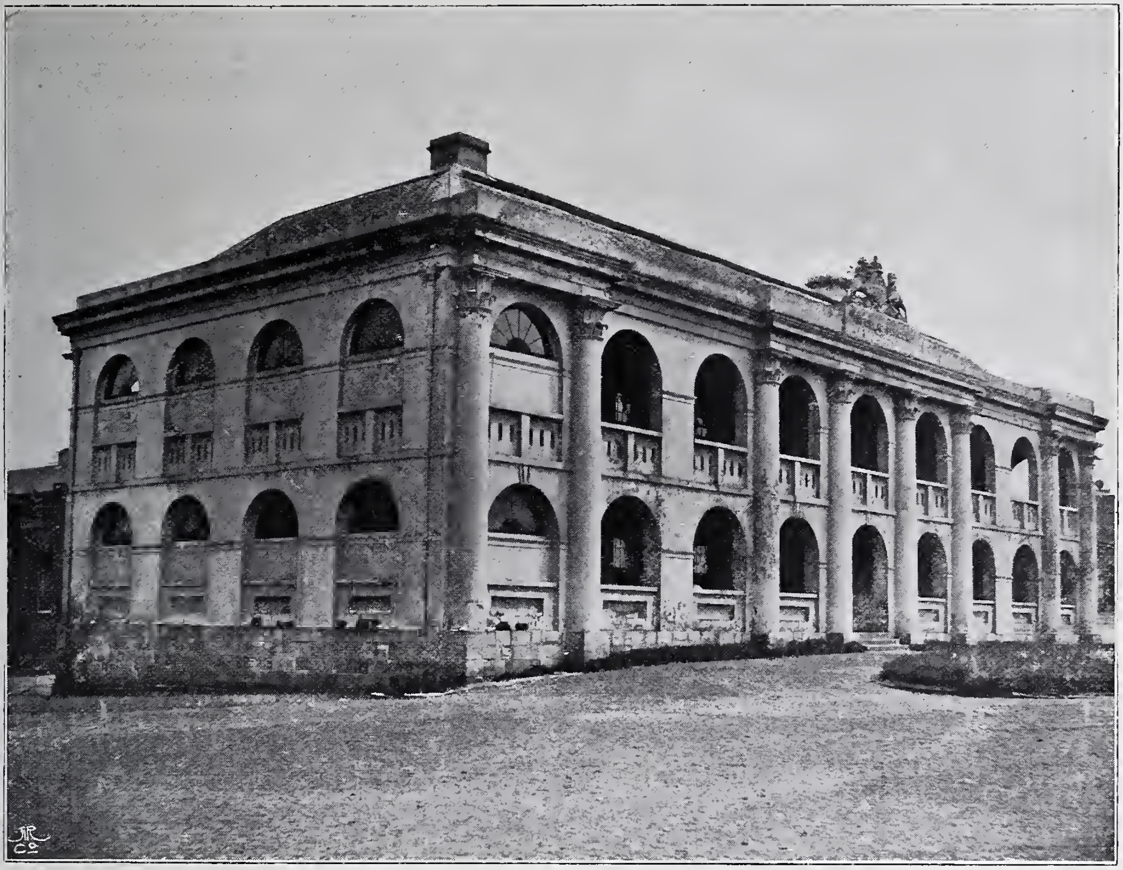


FIG. 7.—FORE STREET PUBLIC SCHOOL, SYDNEY.

The latter, the work of the late Thomas Rowe, is built on the site of a chapel of good classic architecture erected in 1839, one of the first of its kind erected, but pulled down to make room for the present hall.

The historical Parliamentary buildings of Sydney [fig. 9], the Immigration Barracks, now used as law offices, and the Supreme Court House, since greatly altered and added to, were designed by Civil Architect F. H. Greenway, in the days of Governor Macquarie, who held office eleven years, from 1810 to 1821 inclusive. During this period he erected or constructed 250 public works and buildings. The Imperial Commissioner, Mr. Bigge, in his report to the House of Commons, said that this was Governor Macquarie's misfortune; but these buildings have been and still are very useful to New South Wales.

The Criminal Court House, adjoining the Gaol at Darlinghurst, was built in 1836 from designs by the then Colonial Architect, the late Mortimer William Lewis. It is the only specimen of Grecian Doric in Sydney. Mr. Lewis designed Court Houses for Parramatta, Newcastle, and Berrima, also classic in style. He superintended the erection of Government House from designs and drawings by the late Mr. Edward Blore, architect, of London. This building, which occupies a fine site overlooking the harbour and the naval anchorage in Farm Cove, and next to the beautiful Botanical Gardens, is Tudor in style. The foundation-stone was laid by Lieutenant-Governor Colonel Snodgrass on the 26th January 1838, that being the fiftieth anniversary of the foundation of the Colony. This building is now sixty-one years old, and, with the exception of the addition in sandstone of a carriage porch and an arcaded verandah on the eastern front, remains as built in the time of Governor Gipps.

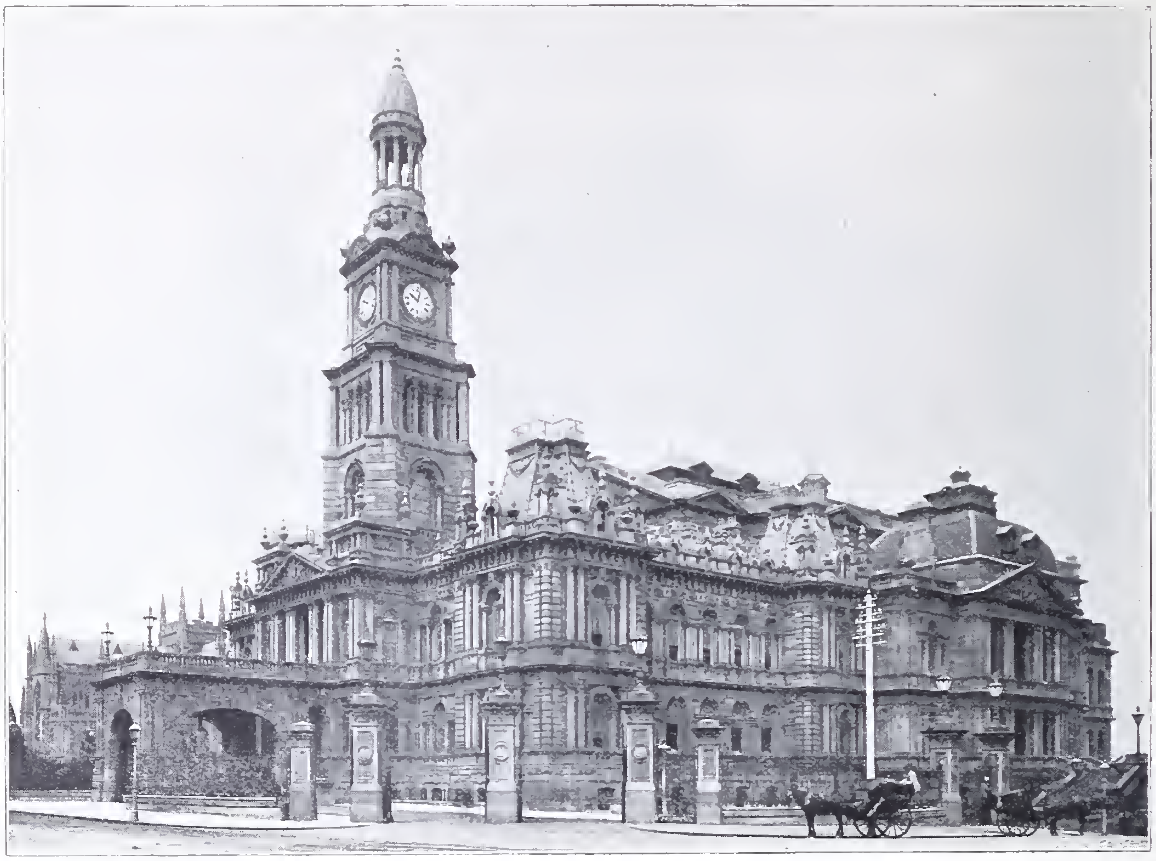


FIG. 8.—TOWN HALL, SYDNEY.

The Observatory, built of sandstone in Governor Denison's time, stands on the site of the first windmill erected in Sydney, close to Fort Phillip. It commands fine views of the city and harbour from the tower. The architecture is Italian. This, together with the Registry Office in Elizabeth Street (a work in a style adapted from the Tudor period), is by the late Alexander Dawson, Colonial Architect. Both buildings have had later additions.

Australian Museum.—The first portion of this structure was designed by the late M. W. Lewis, Colonial Architect, in 1846, but has been so added to and enlarged that the original Greek work has disappeared and given place to its bold Roman architecture. Internally, the portion facing Hyde Park is divided by screens of Corinthian columns into five halls on each floor, and the original portion is one fine hall, with two tiers of galleries, lighted from the roof.

The Public Library in Macquarie and Bent Streets was originally designed by Mr. Henry Ginn, architect, in 1843; the foundation-stone was laid by the late Mr. A. McLeay, and the library was opened to the subscribers in 1846, costing £5,000. Since it has been purchased by the Government it has been rebuilt and added to in the same style of Palladian architecture by the Colonial Architect, and is now double its original size.

The Chief Secretary's Office in Macquarie and Bridge Streets, opposite to Government House gates.—This building, which is of sandstone, was completed in 1880. It is here that the Executive Council meetings are held. The Secretary for Public Works has offices at the western end in Phillip Street, where extensive additions have lately been made. The style of architecture is Italian Renaissance, but its simple outline has recently been destroyed by the addition of a pavilion and roof-storey of French character not in keeping with the original design. In the niches are statues representing Wisdom, Justice, Mercy, Labour, Science, and Art. Opposite, in Bridge Street, is the Treasury, Florentine in style, from designs by the late M. W. Lewis, Colonial Architect.

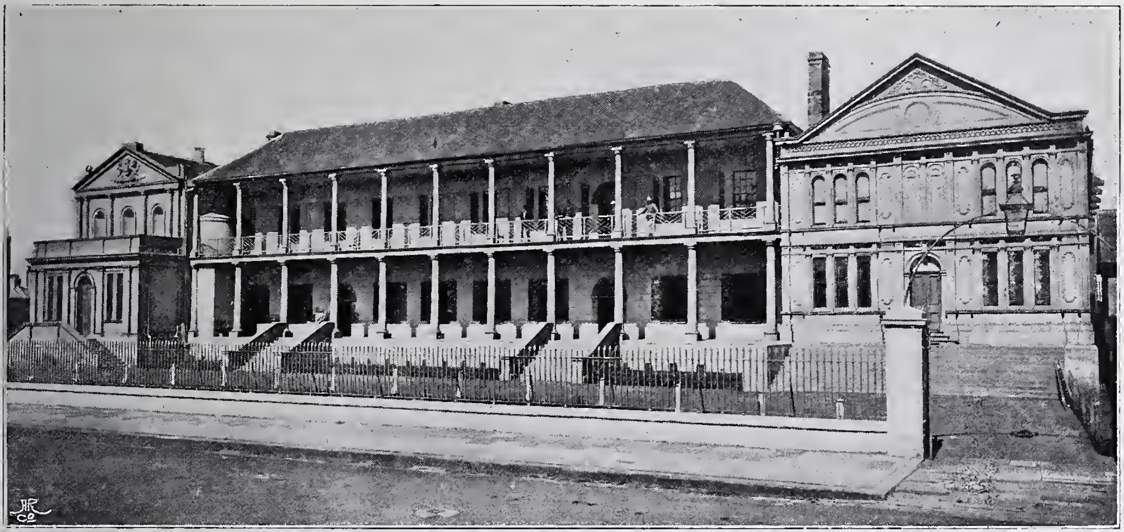


FIG. 9.—THE ORIGINAL PARLIAMENT HOUSE, SYDNEY.

The Lands Office, in Bridge Street, like the Chief Secretary's Office, is also after the Italian Renaissance, of Roman type in its architecture. This building stands alone; it has a frontage to four streets, and was erected in two sections. The first stone was laid on 7th October 1876 by the late Hon. Thomas Garrett, Minister for Lands, on a site in front of the then existing Lands Office. This portion was first completed and occupied, and the second section was built on the site of the old office, and was completed in 1891. The northern elevation to Bridge Street is surmounted by a pavilion, in the centre of which is a revolving dome for astronomical purposes, resting on masonry rising through the roof from the rock foundation. The southern front is dominated by a clock tower, 257 feet in height. Native red granite from Gabo Island, in columns and pedestals, polished in part, is used at three of the entrance doorways. Internally there are two courts, with a large strong-room between. On the four elevations there are 48 niches, 17 of which have statues of explorers, among them being Phillip, Banks, Flinders, Bass, Sturt, Leichhardt, Burke, Wills, &c. The whole edifice is built of sandstone externally and brick internally.

The General Post Office [fig. 10], in George Street, Martin Place, and Pitt Street, was built in two portions. The first, or western, half was begun in 1866. In April 1869 the Duke of Edinburgh set the keystone of the George Street entrance, and in 1874 this portion was occupied for public business. The second, or eastern half, including the campanile, was completed in 1886. The architectural style is Italian Renaissance, of Venetian and Florentine character, in which native grey granite from Moruya was first introduced in the base course, the carved capitals, and in a great many polished columns; the remainder is built of sandstone, all through stone, clean chiselled inside, and rubbed externally. In a niche, over the central entrance in the northern front, is a statue of Her Majesty the Queen, seated; and immediately beneath are reclining figures of Britannia and New South Wales, all in marble,

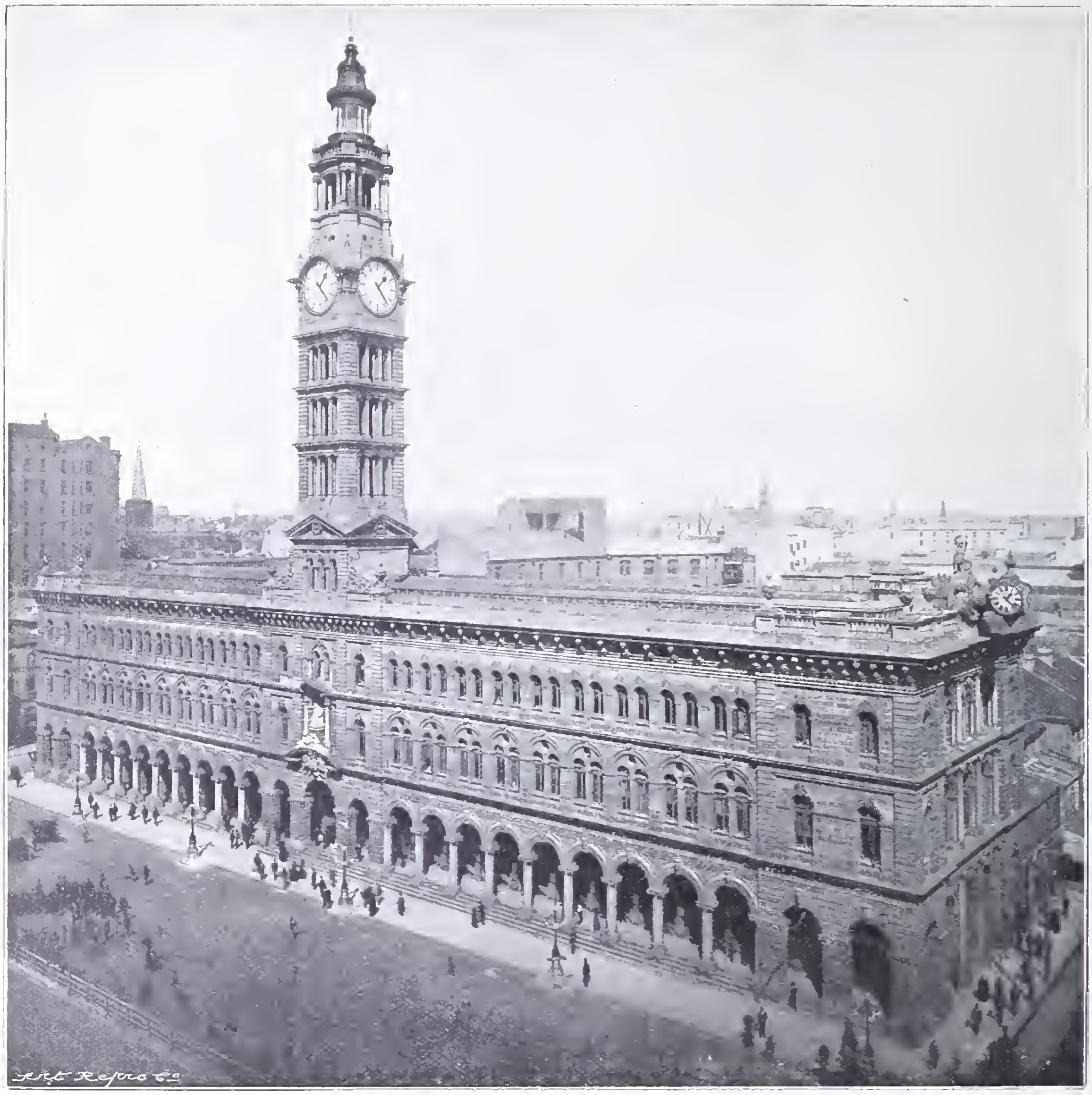


FIG. 10. —THE GENERAL POST OFFICE, SYDNEY.

by the late Giovanni Fontana, sculptor, of London. Surmounting this entrance is a clock tower 230 feet in height. Unfortunately the stately dignity of the building is being marred by the addition of an attic of French design, whose varied line and want of repose is out of harmony with the rest of the structure, and its extra weight is a source of danger.

The Custom House at the Circular Quay is a plain building, of simple Italian architecture, erected in 1887. Of similar character is the Central Police Court recently built. The Police Stations in North George Street and in Woolloomooloo are in prominent positions, the former Italian, and the latter Greek architecture. The new entrance to Darlinghurst Gaol is of appropriate character.

The Mortuary Railway Stations at Sydney and the Cemetery at Rookwood show the application of Gothic architecture to a novel purpose. The former has on a wide platform a ticket office opening into two vestibules, with retiring rooms, and a carriage porch surmounted by a bellcote. The latter, in the cemetery, where the coffins are removed from the train hearse, has platforms on either side, with porches, retiring rooms, and bellcote. Both buildings are of sandstone, and appropriately decorated with sculpture representing angels, cherubs, &c., by the late Thomas Ducket and Henry Apperly, sculptors.

Commercial Buildings.—The Bank of New South Wales, built in 1851, and the Commercial Bank adjoining, built in 1854—the former Florentine astylar, and the latter Roman Palladian—also the London Chartered Bank, Italian, are all the work of the late John Hilly, architect. The Bank of Australasia and the English and Scottish Bank are both astylar, the works of the late E. T. Blacket. The Joint Stock Bank is Italian of a German type. All these buildings are in George Street, the principal street of the city. In Pitt Street are the Union, City, and New Zealand Banks, all Italian Renaissance; the Oriental Bank, with Greek Ionic engaged columns and pediment, by the late William Weaver and W. E. Kemp, architects. The Savings Bank in Barrack Street is Roman in character, with lower and upper colonnade of marble and granite. The banking room and vestibules in all these buildings are spacious, and decorated with marble and colour.

Insurance offices are numerous. The Australian Mutual Provident Society's Office in Pitt Street, the Mutual Life of New York in Martin Place, opposite the Post Office, the Citizens' Life Office in Moore Street, the Mutual Life Office in Wynyard Street, are all in Italian Renaissance, built of sandstone. The Equitable Life of U.S.A. in George Street is Romanesque, and built of trachyte. Like the banks, the business rooms of these institutions are spacious, and richly decorated in marble, colour, gold, and mosaics.

Wool warehouses of imposing and appropriate architecture and of great magnitude are situated in various positions near the quays. Warehouses for general merchandise are numerous, and generally fine imposing structures, picturesquely situated in O'Connell Street, Bridge Street, Clarence Street, and York Street. Shops and offices in the main streets are, with the exception of a few Gothic examples, of Italian or English, or French or German types of Renaissance, many of them good examples. As a whole they give a rich picturesque effect to the narrow, irregular street lines, with their ever-varying undulations and contour, the warm grey stone being enlivened with colour of brick, marble, granite, tile, and terra-cotta.

Clubs and Hotels.—The Australian Club is a red brick structure of Jacobean character, in Macquarie Street, on a commanding site overlooking the harbour and Gardens. The Union Club, in Bligh Street, is of Italian character, and near to it, built of stone of similar style, is the New South Wales Club. The Athenæum, in Castlereagh Street, is a brick cemented edifice. The Hotels Australia and Metropole are fine structures, equipped with modern appliances; and coffee palaces and places of entertainment are numerous and of appropriate design. There is a Royal Naval Home for H.M. sailors, giving every convenience and comfort.

Theatres.—There are six principal theatres, besides music halls. The oldest, the Theatre Royal, is the work of the late John Hilly, architect. It is especially well designed both for seeing and hearing; the box and upper tiers follow the slope of the pit, and the means of exit admit of the rapid escape of the audience in case of need. The other theatres are comparatively new, and are fitted with every modern convenience and well arranged for the safety of the audience and players. All are Italian Renaissance in style, except the latest, The Palace, which is novel, but appropriate in its architecture.

Sydney has no fewer than seven arcades of shops, affording shelter from the sun and heat, and giving convenient ways of access from one crowded street to another. Three of them are the work of the late Thomas Rowe. They are all of Italian architecture, except the latest in Queen Victoria Market Building, which is of Romanesque design and 600 feet long. Fire Brigade Stations, with all the latest modern ideas and improvements, and of appropriate design, have been built in recent years. Spacious Grand Stands of convenient design have been erected at the Cricket Ground, Agricultural Show Ground, and at Randwick Racecourse.

Generally the architecture of Sydney, after passing through the Georgian period and a short classic Greek era, and the rebuilding which followed the gold discovery in 1851, is mainly Italian Renaissance of various types. Of course churches and educational buildings are Gothic, as a rule. Recently from the United States has come Romanesque in an Insurance Office building; and the same style has been applied to Branch Banks, Technical College, Queen Victoria Market Building, and no doubt will run its crudities to seed in warehouses, stores, and shops. In rebuilding a city fine lofty structures are to be seen alongside old and mean buildings. This is unavoidable.

Sydney has a few tall edifices like those common in the United States, and the tendency in crowded business centres is towards increased height, owing to the high price of land, and doubtless the introduction of lifts and the general use of telephones encourage the erection of lofty buildings. There being no municipal law to regulate the height, owing to a defective Building Act, high houses in the narrow streets of Sydney are a source of danger in case of fire, and they interfere with light and air.

There are very many private villas in the suburbs and along the margin of the harbour, and there is invariably one feature, which is considered indispensable for shade and shelter from the heat and sun in this bright and just now almost rainless land, namely, the verandah. The wave of the demon of fashion has reached Australia from Bedford Park. There are many fine specimens of this fascinating, but on the whole mean-looking make-believe picturesque-cottage mode of building, with its bits of rough masonry, red brick hollow wallery, rough-cast, half-timber, and dangerous wall shingles, useless gables and dormers, belvideres, loggias, bow windows, bay windows, half-moon windows, round and horse-shoe windows and great arches, all surmounted with blazing red tiles from France. This craze is now being affected by the speculating builder, and the landscape is marred by staring red crudities; even the quiet beauty of our lovely Botanical Gardens, and the classic precincts of the University, are alike invaded by this vanity, which we may in time get used to, and shall have to tolerate until the inevitable reaction sets in.

Building material in Sydney is mainly sandstone, on which the city stands, and after forty-five years' experience I can say that, when carefully selected and protected by a damp-proof course at the ground level, it is very durable. When first quarried the stone is usually of a bluish grey tint, which on exposure to the atmosphere colours a warm brown; this in time tones into a pleasing grey, and gives a refining effect to mouldings and enrichments. It is easily wrought, and can be got in unlimited quantity and of any size; its composition is insoluble silica, oxides of iron, and alumina. There are excellent bricks of various tints of red, also grey and buff, and terra-cotta of various shades; also fire-resisting lumber. There is marble in abundance, very hard and of every variety of colour, but far from Sydney; granite red and grey, trachyte in various tints, but distant from the city. There are timbers for carpentry, such as ironbark, tallow-wood, black-butt—all very hard and durable, but liable to the ravages of the white ant. For joinery, cedar like mahogany, also pine. Slate for steps and other purposes, but too costly for roof covering; roofing slates are imported. Tiles are also made, and cement equal to the best Portland is manufactured here. Limestone is in abundance, but 100 miles inland.

Decoration.—Carving in stone is freely applied to many of the Sydney buildings, the sandstone being very suitable and easily cut. The artists are generally of European training, some of the early work being carved by those who were employed at the Parliament buildings in London. Internal decoration in colour painting is done by artists from the best European *ateliers*, and also wall decoration and floors in marble and mosaic from Europe. Native marble, granite, and trachyte are also coming into use in decoration.

The names of the early pioneer architects, whose works are referred to, are those of worthy men who have passed over to the great majority. At the present time Sydney has over one hundred architects in practice, amongst whom are many native young men of promise who have been educated and trained to their art and profession in the studios and offices of eminent masters, and in the Technical College, where the various branches of the arts and crafts are taught.

Sculpture, the sister art to Architecture, is fairly well represented in Sydney considering its age and size, and distance from the great art centres of Europe. The city is adorned with eight public monumental statues in bronze. The first example of the plastic art in Australia was the statue of Governor Bourke on a pedestal of Aberdeen granite erected in 1840, and placed in the Outer Domain overlooking the harbour. This work is by the late eminent sculptor E. H. Baily, R.A. Next in order of time is the statue of Prince Albert, by Theed, at the north entrance of Hyde Park on Queen Square, executed in 1866. This fine work was selected by Her Majesty, whose noble representation by Boehm stands opposite in the same square. Then there is Woolner's great work of Captain Cook in Hyde Park. Recently, in the Palace Garden, there has been put up a statue to Governor Phillip on a pedestal of white marble adorned with reclining figures representing allegorically the advent of Civilisation in Australia; it is surrounded by four fountains, the work of Simonetti, a resident sculptor. In Macquarie Place and near the Exchange is a statue of the late Thomas S. Mort, an enterprising and patriotic colonist, by P. E. Connoly, sculptor. In Wynyard Square there is a fine work, by Signor Giovanni Fontana, of the late John Dunmore Lang, D.D., patriot and statesman; and in Hyde Park a statue of the late R. H. William Bede Dally, the originator of the Soudan Contingent (Mr. White, sculptor). This work was cast in Sydney.

Sydney has several fountains, one of which in the Botanic Gardens has a fine figure of a water nymph in bronze by Birch. In these fine gardens are many statues in marble, copies from Italy of such as the Apollo Belvedere, Venus de Medicis, Mercury, Discobolus, Meleager, Canova's Boxers, and many others. The Centennial Park, laid out in 1888, which covers 640 acres, and contains a three-mile drive and asphalted footpaths between trees, has many marble and terra-cotta statues. Of the former are those of Gladstone, Disraeli, Lincoln, Garfield, Parkes, and Dickens, &c. In the Chief Secretary's office are marble statues of the Queen and Prince of Wales, and New South Wales, by Fontana. Sydney is indebted to the late Sir Henry Parkes for its fine display of the sculptor's art. The Art Gallery, which is now being enlarged, and is in a classic style of French type, contains some good works in sculpture and a fine collection of pictures in oil and water-colour.

9, Conduit Street, London, W., *29th July* 1899.

CHRONICLE.

THE MIDSUMMER EXAMINATIONS.

Preliminary: Newly registered Probationers.

A Preliminary Examination qualifying for registration as *Probationer R.I.B.A.* was held in London and the various other centres enumerated below on the 13th and 14th ult. In the non-Metropolitan centres the Examination was conducted by the Allied Societies of the respective districts. Claims for exemption from sitting for the Examination were allowed in the case of twenty-five applicants. The number examined in each district and the results are shown in the following table:—

	Examined	Passed	Relegated
London	93	69	24
Birmingham	9	9	—
Bristol	5	5	—
Cardiff	11	5	6
Dublin	4	3	1
Glasgow	2	2	—
Manchester	19	18	1
Newcastle	10	6	4
York	13	9	4
	166	126	40

The passed candidates, together with those exempted—making a total of 151—have been registered as Probationers, and their names, &c., are herewith given in alphabetical order:—

ADKINS: Stanley John Widdicombe; Mansfield, Elphinstone Road, Hastings [School of Art, Hastings].

ARCHIBALD: Richard James; 56, Grange Road East, Middlesbrough, Yorks [*Master*: Mr. Robert Moore].

ARTHUR: Thomas Main; West Parkhill, Airdrie [Airdrie Academy].

BARBER: Richard Alfred; University School, Reigate, Surrey [University School, Reigate].

BARCLAY: Arthur James; 24, Brownlow Place, Ferryden, Montrose [*Master*: Mr. John Sim].

BARKER: Walter John Raymond; 127, Lower Seedley Road, Pendleton, Manchester [*Master*: Mr. Thomas Muirhead *].

BARTHOLOMEW: Herbert Cecil; Whitcliffe House, Meads, Eastbourne [*Masters*: Messrs. Spurrell * & Murray].

BEAVAN: Thomas Albert; 1, Balaclava Road, Roath Park, Cardiff [*Master*: Mr. Edwin Seward *].

BERRY: Francis Richard; 24, Cheviot Street, Lincoln [*Master*: Mr. H. H. Dunn *].

BEVIS: Charles Thomas; Elm Grove House, Southsea [*Master*: Mr. Charles W. Bevis *].

BONWICK: Herbert James; 82, Sutherland Avenue, Maida Vale, W. [*Masters*: Messrs. Smedley & Lockwood].

BOSWELL: George Arthur; Jasper House, 59, Dunstall Road, Wolverhampton [*Master*: Mr. W. Edwards].

BOWDLER: Frank Ernest; 4, Whitehall Gardens, Shrewsbury [*Master*: Mr. C. R. Dalgleish].

BOWES: Harold MacGowan; 4, Falmouth Road, S.E. [*Masters*: Messrs. Read * & MacDonald *].

BRIGGS: Harold Percy; 45, Lorne Road, Stroud Green, N. [Polytechnic School of Architecture].

BROMHEAD: Frank Harold; 31, Owen Street, Tipton, Staffs [*Master*: Mr. Arthur Gamage].

CALLOW: Charles Fry; 71, London Road, St. Leonards-on-Sea [*Master*: Mr. Arthur Wells *].

CALVERT: Vere; Harefield, Toller Lane, Bradford [*Master*: Mr. Rhodes Calvert *].

CASTELLO: Manuel Nunes; Hazeldean, Sydenham Hill, S.E. [*Master*: Mr. Lewis Solomon *].

CHAMBERLAIN: Reginald Percy; Ashcroft, Hinckley Road, Leicester [*Master*: Mr. Stockdale Harrison *].

CLEVELAND: Charles Barry; c/o W. M. Fawcett, Esq., 4, Trumpington Street, Cambridge [*Master*: Mr. W. M. Fawcett *].

COLTHURST: William Bunter; Northfield House, Taunton, Somerset [*Master*: Mr. F. W. Roberts].

CONSTANT: Reginald Oakely; Blackwater House, Eastbourne College [Eastbourne College].

CRANEY: George Herbert; 2, Clifton Villas, Broughton Road, Ealing Dean, W. [*Master*: Mr. Charles H. Worley *].

CROCKETT: Basil Edwin; Bush Lane House, Cannon Street, E.C. [*Master*: Mr. E. A. B. Crockett].

CULVER: Herbert George; Milford House, John Street, Hampstead [*Master*: Mr. H. A. Rawlins *].

DALE: Clara Martha, B.A.; Westbourne, Buxton, Derbyshire [Owens College, Manchester].

DAVISON: William Rupert; Kingshaw, Woldingham, Surrey [Cavendish College, Matlock].

DAWSON: Harold; 7, Ranby Road, Endcliff, Sheffield [*Master*: Mr. Charles Hadfield *].

DAY: Douglas William; Deanhurst, Knighton Drive, Leicester [*Master*: Mr. John Day].

DELBRIDGE: William John; 22, South Street, Greenwich, S.E. [*Master*: Mr. H. Busbridge].

DOWGLASS: Arthur Pollock; University School, Reigate, Surrey [University School, Reigate].

EDLESTON: Ernest Harcourt; 42, Rumford Street, C.-on-M., Manchester [*Master*: Mr. R. Basnett Preston *].

ELLIOT: John Augustus Gilbert; 16, Royal Terrace, Edinburgh [*Masters*: Messrs. Peddie & Washington Browne].

ELLIS: Edward Miller; 18 and 19, Fenchurch Street, E.C. [*Master*: Mr. E. B. Ellis *].

EVANS: Thomas Charles; 55, Piccadilly, Hanley [*Masters*: Messrs. Wood & Hutchings *].

FAIRWEATHER: Norman Blumer; 81, Grove Park, Denmark Hill, S.E. [Dulwich College].

FARMER: James Wesbrook; 130, Queen's Road, Dalston, N.E.

GARWOOD: Walter Henry; 11, Essex Street, Norwich [*Masters*: Messrs. G. J. Skipper * & F. W. Skipper].

GLENDINNING: James John; West View, Halifax [*Masters*: Messrs. Mawson & Hudson].

GOFF: Edgar Thomas; Hollywood, Park Road, Lowestoft [*Master*: Mr. W. J. Roberts].

GOTCH: Laurence Mursell; Chesham House, Kettering [*Masters*: Messrs. Gotch * & Saunders].

GRAVENOR: Harold James; 111, Lewisham High Road, New Cross, S.E. [*Master*: Mr. T. Durrans *].

GREENHOW: Charles Ingleby; 5, Eslington Terrace, Newcastle-on-Tyne [*Master*: Mr. A. B. Plummer *].

GUNN: Edwin George Harry; 18, Larch Road, Cricklewood, N.W. [*Master*: Mr. W. A. Finch].

HALL: Herbert; 1, Quarry Terrace, Hastings [*Master*: Mr. Philip Tree *].

HAMILTON: Thomas Welsh; Home Lodge, Greenock [*Master*: Professor Gourlay *].

HAMPSON: Joseph Louis; 360, St. Helen's Road, Over Hulton, Bolton [*Masters*: Messrs. Bradshaw * & Gass *].

HANKS: Thomas Gilbert Luton; Allonby, Alexandra Road, Reading [*Master*: Mr. W. Roland Howell *].

HARGREAVES: John Horner; Ivydene, Goulden Road, Withington, near Manchester [*Master*: Mr. Edward George Stead *].

HAYNES: Eustace Lisle; Donnington House, St. Alban's, Herts [*Master*: Mr. Wm. Woodward *].

HAYWARD: Frank Woodbury; 4, Benson's Terrace, Rowbarton, Taunton [*Master*: Mr. F. W. Roberts].

HEATH: Albert William; Kingsbridge House, Westcombe Park, S.E. [*Master*: Mr. A. A. Oakden].

HECTOR: John Black; 46, Fountainhall Road, Aberdeen, N.B. [*Masters*: Messrs. Smith & Kelly].

HENRY: James; 34, Egerton Crescent, South Kensington, S.W. [*Master*: Mr. W. Henry White *].

HILDESLEY: Percival Tresillian; Rougemont, Morella Road, Wandsworth Common, S.W. [*Master*: Mr. Robert P. Notley *].

HILL: Bertram Charles; Stapleton Rectory, Stapleton, Bristol [*Master*: Mr. Fred. Shove].

HILL: Howard; 2, Marlborough Street, Westoe, South Shields [*Master*: Mr. J. Ernest Stout].

HITCHCOX: Cyril William: Broughton, Clytha Park, Newport, Mon. [*Masters*: Messrs. W. Graham Hitchcox & Co.].

HOBSON: Florence Fulton; 6, Hopefield Avenue, Belfast [*Masters*: Messrs. J. J. Phillips & J. St. J. Phillips *].

HOLCOMBE: Charles John Stewart; 92, Darenth Road, Stamford Hill, N. [*Master*: Mr. Thomas Batterbury *].

HOLDEN: Arthur Freeman; 1, Highfield Terrace, Highfield Road, Chesterfield [*Master*: Mr. W. C. Jackson].

HOLDEN: Walter Frederick Clarke; St. Paul's Place, Hills Road, Cambridge [*Masters*: Messrs. Rowe * & Scott].

HOWSHIP: George Oswald; 30, Sebert Road, Forest Gate, Essex [*Master*: Mr. J. Falkingbridge Parker].

HUGHES: Rowland John; Britton Villa, Llanfairfechan, N. Wales [*Master*: Mr. Jos. Owen].

HUMPHRY: Francis John; Blackwater House, Eastbourne College, Eastbourne [Eastbourne College].

INGHAM: Oates; Hullen Edge, Elland, Yorks [*Master*: Mr. J. R. Purdy].

INGLEBY: Robert William; 15, Azalea Terrace, South Sunderland [*Master*: Mr. G. T. Brown].

JACKSON: George Herbert; Willoughby, Westby Road, Boscombe, Bournemouth [*Master*: Mr. J. W. Lucas].

JACOBS: Thomas Windsor; 23, Cathedral Road, Cardiff [*Master*: Mr. Edwin Seward *].

JENKINSON: John Mansell; 30, Wostenholm Road, Sheffield [*Masters*: Messrs. Hemsoll & Paterson *].

JOHNSON: Ernest Nicholas; Austin Friars Chambers, Newport, Mon. [*Masters*: Messrs. Benjamin Lawrence & Son].

JOHNSTON: Reginald; c/o Mr. S. Clifford Tee, 50, Moorgate Street, E.C. [*Master*: Mr. R. Spyer].

JOSEPH: Ernest Martin; 34, Inverness Terrace, W. [*Masters*: Messrs. Joseph,* Son, & Smithem *].

JUDGE: Leonard; 7, Pall Mall, S.W. [*Master*: Mr. Mark H. Judge *].

KENNEDY: Edwin Riddell; 3, Mount Delphi, Antrim Road, Belfast [*Masters*: Messrs. Graeme Watt & Tulloch *].

KESTEVEN: Leofric; Hillwood, Waverley Grove, Hendon, N. [*Master*: Mr. Ernest E. Fetch *].

LANSDOWN: Frank; 22, Melville Street, Lincoln [*Masters*: Messrs. Goddard & Son].

LEGGETT: Melville Charles Maryon; Aston Villa, Tilehurst Road, Reading [*Master*: Mr. J. Hugh Goodman].

LELLO: Thomas Stanley; c/o Rev. Dr. Finnemore, 88, Upper Hanover Street, Sheffield [*Master*: Mr. Joseph Smith *].

LONG: Leland; 66, Prince of Wales Road, N.W. [*Master*: Mr. George Waymouth *].

LONGDEN: Reginald; St. Paul Street, Burslem, Staffs [*Master*: Mr. Lewis.]

McDOWELL: Cecil Grange; 83, Rathmines Road, Dublin [*Master*: Mr. C. A. Owen *].

McKILLIAM: James Neilson Kirkwood; Ballandalloch, Blackheath [*Master*: Mr. George Baines *].

MacLAREN: Alexander Duncan; 62, Eccles Old Road, Pendleton, Manchester [*Masters*: Messrs. Worthington * & Son *].

MADDOCK: Sydney; Main Street, Frodsham, Cheshire [*Masters*: Messrs. Wilson * & Talbot].

MAJOR: William Paul; 9, Northfields, Bridgwater, Somerset [*Masters*: Messrs. Samson * & Cottam *].

MARSHALL: Arthur John; 67, Peascod Street, Windsor [*Master*: Mr. Goymour Cuthbert *].

MARSHALL: Reginald Peter; The Poplars, Handsworth, Sheffield [Grammar School, Retford].

MASSEY: Izmay; Harper Green Road, Farnworth [*Master*: Mr. T. Greenhalgh].

MEADEN: John Gilbert Pitney; 10, Liston Road, Clapham, S.W. [*Master*: Mr. R. H. Hill *].

MEAKIN: Francis; Castle Hill, Duffield, near Derby [*Master*: Mr. J. B. Mason].

MILLAR: Thomas Andrew; 5, Claremont Terrace, Glasgow [*Master*: Mr. James Thomson *].

MOORE: Harold Ellis; 15, Queen Street, Redcar, Yorks [*Master*: Mr. Robert Moore].

MORRIS: Henry Silver; 23, Mornington Road, Regent's Park, N.W. [*Master*: Mr. George T. Hine *].

MUNDELL: Edward Joseph; Litton, Parkstone Road, Poole, Dorset [*Master*: Mr. H. F. Barnes].

MYERS: John; 33, Randolph Crescent, Maida Vale, W. [*Master*: Mr. Delissa Joseph *].

MYERS: Norman Toller; Holly House, Clarendon Road, Watford, Herts [Royal College of Art, South Kensington].

OSBORNE: William Robert; Ferndale, The Drove, Swindon, Wilts [*Master*: Mr. Harold Brakspear *].

OSLER: Francis; 6, Clare Road, Halifax, Yorks [*Masters*: Messrs. T. Worthington * & Son *].

OWEN: John; Llys Dorvil, Blaenau Festiniog [Festiniog County School].

OXLEY: Wilfred Benjamin; Town Hall, Leicester [*Master*: Mr. S. F. Poynor].

PARKER: Alfred Gwynne; Droitwich Road, Worcester [*Master*: Mr. A. H. Parker].

PARKINSON: Charles Edmund Lancaster; 74, Abingdon Road, Kensington [*Master*: Mr. F. Whitmore].

PAUL: Courtenay Talbot Saint; Cardwell Chambers, Marsh Street, Bristol [*Masters*: Messrs. Paul * & James *].

PERKINS: Cecil Henry; 8, Denmark Street, Wokingham [*Master*: Mr. A. E. Sidford].

PILLING: Percy Cunliffe; 5, Westwood Road, Bolton [*Master*: Mr. J. Pilling *].

POTTER: Alan; 43, Manchester Street, Manchester Square, W. [*Master*: Mr. Alfred H. Hart *].

POTTS: Bessie; 51, Parsons Street, Banbury, Oxon. [Oxford Lodge Ladies' School].

PROCTER: John Clifford; 51, Bootham, York [Friends' School, Bootham].

RAMSBOTTOM: John William; 72, Wellington Road, Heaton Chapel [*Master*: Mr. A. G. Wilkinson].

READ: Kenmuir Harry; 97, Castle Street, Reading, Berks [*Master*: Mr. J. H. Goodman].

REYNOLDS: Frank Stephen; San Remo, Acock's Green, Birmingham [*Masters*: Messrs. Cox & Silk].

RICHARDSON: Henry John; St. Winifred's, Sedlescombe Road, St. Leonards-on-Sea [*Master*: Mr. Philip Henry Tree *].

ROBERTS: Haydn Parke; 18, Clevedon Terrace, Roath, Cardiff [*Master*: Mr. H. Tudor Thornley].

ROUND: Abel; Heworth Cottage, Warley, Birmingham [*Master*: Mr. William Henman *].

RUMSBY: Walter Samuel; Ennisfall, King's Road, Lansdowne Park, Bournemouth [*Master*: Mr. J. F. Fogerty *].

SALOMONS: Gerald Sanville; Platt Lane, Rusholme, Manchester [*Masters*: Messrs. Salomons * & Steinthal].

SANDERSON: Frank; Station House, Guisbrough, Yorks [*Masters*: Messrs. R. Lofthouse & Sons *].

SHEPHERD: Godfrey Daniel Bower; 15, Prospect Place, Long Ditton [*Master*: Mr. J. Murray Robertson *].

SHEPPARD: John Mortimer; 32, Upper Bedford Place, Russell Square, W.C. [*Master*: Mr. Charles Granville Baker].

SHERWOOD: Arthur Wynne; 57, Bruce Road, Bromley-by-Bow, E. [Magdalen College School, Oxford].

SKIPPER: Charles Frederick; 25, Alkham Road, Stoke Newington, N. [*Masters*: Messrs. Cheston * & Perkin].

SMITH: Charles Hodgkinson; c/o G. H. Fellowes Prynne, Esq., 6, Queen Anne's Gate, Westminster, S.W. [*Master*: Mr. Fellowes Prynne *].

SMITHERS: Alec; 14, South Croxted Road, West Dulwich, S.E. [*Master*: Mr. W. Campbell Jones *].

SOUSTER: Ernest George William; 46, Lower Mounts, Northampton [*Master*: Mr. W. Hull].

SPEIR: John Allan; 8, Cowbridge Road, Cardiff, South Wales [*Master*: Mr. Edwin Seward *].

SPENCER: Harry; Aston Villa, Hucknall Torkard, Notts [*Master*: Mr. W. H. Sully].

SPRULES; Francis Adams; Trelawne, Camborne Road, Sutton, Surrey [Architectural School, King's College].

SPURR: Willie Rowland; Rouse Mill Lane, Batley [*Masters*: Messrs. Walter Hanstock & Son].

STOCKWELL: Edward; Croft House, Morley, near Leeds [*Master*: Mr. Wm. Bakewell *].

STONE: Reginald Holmes; 94, Palace Gardens Terrace, W. [*Master*: Sir Arthur Blomfield,* A.R.A.].

STYLES: Mervyn James; 49, Church Street, Rugby [*Master*: Mr. William Doubleday].

SUTTON: Fred; Bladud, Bulmershe Road, Reading [*Master*: Mr. G. W. Webb *].

SWANN: William Herbert; 17, Gill Street, Nottingham [*Master*: Mr. Watson Fothergill].

SYKES: John Reynold; Oxford House, Eaton Place, Brighton [Brighton College].

TATHAM: Trevoe John; c/o Mrs. Tatham, 9, North Hill, Highgate, N. [*Master*: Mr. Herbert O. Ellis].

TAYLOR: Joseph Henry; Sir Walter St. John's School, High Street, Battersea, S.W. [*Master*: Mr. Arthur H. Ryan-Tenison *].

THOMPSON: Charles Joseph; 16, Gorst Road, Wandsworth Common, S.W. [*Master*: Mr. John A. Gill Knight *].

THORP: Clifford; Moss Bank, Whitefield, near Manchester [*Master*: Mr. Thomas Thorp].

TOOP: Frank John; 91, Monks Road, Lincoln [*Masters*: Messrs. W. Watkins * & Son *].

VINING: John Norman Randall; Grove House, Jews Walk, Sydenham, S.E. [*Master*: Mr. J. Randall Vining].

WATKINS: Thomas William; South-Eastern College, Ramsgate [South-Eastern College].

WILCOCK: John; 42, Moorhead Villas, Shipley, Yorks [*Master*: Mr. William Wilcock].

WILKINSON: John Robert; 17, Baring Street, South Shields [*Master*: Mr. J. Wardle Donald *].

WILLEY: Frederick; Tang Hall Cottage, York [*Master*: Mr. William Hepper *].

WILLSON: Sidney George Nicholson; The Old Rectory House, Wimbledon Park [King's College School, Wimbledon].

WRIGHT: William Henry Birch; 2, Park Villas, West Parade, Lincoln [*Master*: Mr. H. H. Dunn *].

YATES: Charles Stanley; Oak Lodge, Carson Road, West Dulwich, S.E. [*Master*: Mr. F. A. Powell *].

YOUNG: Thomas; 19, Trajan Street, South Shields [*Master*: Mr. J. H. Morton *].

YOUNGMAN: Lionel Stanley; Sutton Court, Grosvenor Road, Bournemouth [*Masters*: Messrs. H. E. Hawker & Mitchell].

The asterisk (*) denotes members of the Institute.

Intermediate: Newly registered Students.

The Intermediate Examination, qualifying for registration as *Student R.I.B.A.*, was held on the 13th, 14th, and 15th June in London and the other centres mentioned below, with the following results:—

	Examined	Passed	Relegated
London	38	18	20
Birmingham	3	2	1
Cardiff	3	2	1
Glasgow	3	2	1
Manchester	5	2	3
York	2	2	—
	54	28	26

The following are the names of the successful candidates, placed in order of merit:—

FLEMING-WILLIAMS: Charles Lionel [*Probationer* 1897]; 56, Kenninghall Road, Clapton, N.E. [*Master*: Mr. Rowland Plumbe *].

DETMAR: Lionel Gordon [*Probationer* 1896]; Ashburton, Sutton, Surrey [*Master*: Mr. W. Hilton Nash *].

WOOD: Douglas [*Probationer* 1898]; 5, Westbourne Avenue, Hull [*Masters*: Messrs. Brodrick, Lowther & Walker].

GROVE: John Wornum [*Probationer* 1896]; Lovelands, Kingswood, Reigate [*Master*: Mr. T. R. Hooper *].

CUBITT: Horace William [*Probationer* 1897]; Langham House, Gordon Road, Lowestoft [*Master*: Mr. J. W. Cockrill *].

HALSE: Sidney Joseph [*Probationer* 1896]; 41, Filmer Road, Fulham, S.W. [*Master*: Mr. John Medland *].

KENT: Ivan Means [*Probationer* 1895]; Rivington, Newmarket Road, Norwich [*Master*: Mr. George Skipper *].

BRIGHT: Lawrence Lee [*Probationer* 1895]; 9, St. Peter's Church Walk, Nottingham [*Master*: Mr. Lawrence Bright].

ROBERTSON: Alexander Robert [*Probationer* 1898]; 26, Gordon Street, Gordon Square, W.C. [*Master*: Mr. George Lethbridge *].

GIBBS: Thomas Harry [*Probationer* 1895]; 39, Poland Street, Oxford Street, W. [*Master*: Mr. G. H. Fellowes Prynne *].

SIMPSON: Hugh Dykes [*Probationer* 1897]; c/o H. J. Blanc, Esq., 73, George Street, Edinburgh [*Master*: Mr. Hippolyte J. Blanc].

NORRIS: Edward Berks [*Probationer* 1897]; 301, Charles

Road, Small Heath, Birmingham [*Master*: Mr. G. R. Faulkner].
DEAN: William Mackereth [*Probationer* 1896]; 59, Milton Road, Gravesend [*Master*: Mr. T. J. Walford].
HAYWOOD: Percival Joseph [*Probationer* 1895]; 5, Lanark Villas, Maida Vale, W. [*Master*: Mr. Charles R. Guy Hall *].
MACKENZIE: Henry Blinman [*Probationer* 1897]; Lochbroom House, Senghennydd Road, Cardiff [*Master*: Mr. E. H. Bruton *].
STILLMAN: Michael [*Probationer* 1898]; Trevor House, Leckhampton Road, Cheltenham [*Master*: Mr. H. A. Prothero *].
GALL: Robert Robb [*Probationer* 1898]; 129, Camden Street, N.W. [*Master*: Mr. A. Saxon Snell *].
ROWBOTHAM: Harry Arnold [*Probationer* 1897]; Hall Square, Denbigh, North Wales [*Master*: Colonel R. Lloyd-Williams].
MONRO: Charles Ernest [*Probationer* 1891]; Saxonholme, Bearsden-in-Glasgow [*Master*: Mr. James M. Monro].
HOBBISS: Holland William [*Probationer* 1897]; Penzance Villa, Washwood Heath, Birmingham [*Master*: Mr. Alfred J. Dunn *].
OAKES: Leonard Rycroft [*Probationer* 1896]; 17, Market Street, Chorley [*Master*: Mr. W. Cecil Hardisty].
CROWLEY: Walter St. Leger [*Probationer* 1896]; Innisfallen, Teilo Street, Cardiff [*Master*: Mr. C. B. Fowler *].
HINCHLIFFE: Percy Archibald [*Probationer* 1896]; Ayrfield House, Victoria Street, Barnsley [*Masters*: Messrs. Perkin * & Bulmer *].
DAVIES: William James [*Probationer* 1897]; Thornton Dene, Sidcup, Kent [*Master*: Mr. T. E. Lidiard James *].
PEART: Andrew Mackintosh [*Probationer* 1898]; West View, London Road, Newcastle, Staffs [*Masters*: Messrs. Lynam,* Beckett * & Lynam].
SLATER: Martin Arthur [*Probationer* 1896]; 74, Lincoln Road East, Peterborough [*Master*: Mr. H. M. Townsend *].
WRIGLEY: Francis Carr [*Probationer* 1897]; 8, Barrowgate Road, Chiswick [*Master*: Mr. W. H. Thorp *].
GROVE: Richard Thomas [*Probationer* 1893]; St. Ives, Milton Road, Harpenden [*Master*: Mr. T. Barnes Williams *].

The asterisk (*) denotes members of the Institute.

The foregoing have been entered on the Register of *Students R.I.B.A.*

Final: Qualified for Candidature as Associate.

The Final and Special Examinations, qualifying for candidature as *Associate*, were held in London only, from the 23rd to the 29th ult. Of the thirty-seven candidates examined, fifteen passed and twenty-two were relegated in various subjects. The following are the successful candidates:—

BARKER: Raymond Turner [*Probationer* 1890, *Student* 1898]; Grove House, Southgate.
BROMLEY: Henry Thomas [*Probationer* 1893, *Student* 1897]; 52, Lincoln's Inn Fields, W.C.
DUNSTALL: Herbert Henry [*Probationer* 1891, *Student* 1893]; 52, Millbank Street, Westminster, S.W.
GILFORD: Hubert Ernest [*Probationer* 1895, *Student* 1897]; Edwalton Lodge, Edwalton, near Nottingham.
HALE: Charles [*Probationer* 1895, *Student* 1897]; Fairfield, Queensberry Road, Kettering.
HUNT: John [*Probationer* 1890, *Student* 1894]; 3, New Inn, Strand, W.C.
KENDALL: George Ernest [*Probationer* 1894, *Student* 1896]; The Limes, North Dulwich, S.E.
LUCAS: Thomas Geoffry [*Probationer* 1890, *Student* 1891]; Western House, Hitchin, Herts.
NEUBRONNER: Harry Alfred; 3, Victoria Road, Kensington, W.
ROSS: Walter Gray [*Probationer* 1893, *Student* 1895]; 1, West Street, Finsbury Circus, E.C.
SETTLE: William Moss [*Probationer* 1894, *Student* 1896]; Brooklyn, Earl's Court Square, S.W.
SHARPE: Thomas [*Probationer* 1891, *Student* 1894]; Laurel Bank, Kendal.
TRAYLEN: Henry Francis [*Probationer* 1892, *Student* 1894]; 15, Lincoln Street, Leicester.
VOWLES: Thomas Hubert Hardinge [*Probationer* 1892, *Student* 1894]; 29, Queen Street, Oldham.
WARMAN: Percy John [*Probationer* 1894, *Student* 1896]; 1, Alwyne Road, N.

The number of failures in the various divisions of the Final Examination was as follows:—

I.	Design	17
II.	Mouldings and Ornament	16
III.	Building Materials	4
IV.	Principles of Hygiene	6
V.	Specifications	3
VI.	Construction, *Foundations, &c.*	3
VII.	Construction, *Iron and Steel, &c.*	2

The Cates Prize for Testimonies of Study.

Owing to the failure of the students who sent in the best testimonies of study to observe the express conditions of the Prize offered by Mr. Arthur Cates [see KALENDAR, p. 288], the Prize for the June Examination will not be awarded.

The Standing Committees 1899-1900.

The following appointments to the Standing Committees have been made by the Council under By-law 46:—

Art.—Sir L. Alma Tadema, R.A. [*H.A.*]; Mr. H. W. Brewer [*H.A.*]; Mr. Thomas E. Collcutt [*F.*]; Mr. Alfred Gilbert, R.A. [*H.A.*]; Sir John Taylor [*F.*].

Literature.—Professor Baldwin Brown, M.A. [*H.A.*]; Mr. J. D. Crace [*H.A.*]; Mr. E. W. Hudson [*A.*]; Dr. A. S. Murray [*H.A.*]; Colonel Lenox Prendergast [*H.A.*].

Practice.—Mr. Thomas Blashill [*F.*]; Mr. F. S. Brereton [*F.*]; Mr. W. H. Seth-Smith [*F.*]; Mr. John Slater, B.A. [*F.*]; Mr. C. J. Smithem [*F.*].

Science.—Mr. H. F. Donaldson, M.Inst.C.E. [*H.A.*]; Mr. J. S. Gibson [*A.*]; Mr. Hugh Leonard [*H.A.*]; Mr. F. T. Reade, Assoc.M.Inst.C.E. [*H.A.*]; Mr. George Pearson [*A.*].

Resignation.

Mr. H. L. Florence has resigned his position as Vice-President and his membership of the Literature Standing Committee.

Presidents of Allied Societies elected Fellows.

At recent meetings of the Council the following gentlemen, being Presidents of Allied Societies, and found by the Council to be eligible and qualified for membership under the Charter and

By-laws, were, under the proviso to By-law 9, duly elected Fellows of the Royal Institute—viz.:

WILLIAM CARBY HALL [*A.*], President of the Leeds and Yorkshire Architectural Society; of 42 & 43 Prudential Buildings, Park Row, Leeds—*elected 3rd July* 1899.

CHARLES KING, President of the Devon and Exeter Architectural Society; of 8 Princess Square, Plymouth—*elected* 10*th July* 1899.

Photographs of New South Wales Architecture.

Mr. James Barnet [*F.*], the writer of the Paper "Architectural Work in Sydney, New South Wales" in this issue, has most generously supplied the Editor with over a hundred photographs of buildings in the colony, all of which, for many considerations, cannot be reproduced in the JOURNAL. But the whole collection, mounted and bound together in a volume, will be placed, as a donation from Mr. Barnet, in the Library, to which they will form a valuable and interesting addition. As Colonial Architect in New South Wales for nearly thirty years, Mr. Barnet has erected many public buildings, one of which, the New General Post Office, is illustrated on page 514.

Architecture in Victoria.

The next issue of the JOURNAL will contain an article on "The Architecture of Victoria," by Mr. Lloyd Tayler [*F.*], who acts as Hon. Secretary for the Institute in the Colony.

The Church of San Donato.

Mr. John Hebb desires the statement to be made that the paragraph on the above subject which appeared in the last issue of the JOURNAL [page 487] was taken from a note to a poem by Signor Giosuè Carducci, entitled "La Chiesa di Polenta," recently published in the Italian magazine *L'Italia*. The lines from the poem in question, which were omitted from Mr. Hebb's note owing to exigencies of space, are as follows:—

Ecco la chiesa. E susse ella ignoti
Servi morian tra la romana plebe,
Quei che fûr poscia i Polentani e Dante
Fecegli eterni.

Forse qui Dante inginocchiossi? L' alta
Fronte che Dio mirò da presso chiusa
Entro le palme, ei lacrimava il suo
Bel San Giovanni.

The Tower Bridge.

Mr. H. H. STATHAM writes:—

I see that in No. 15 of the JOURNAL Mr. Lovegrove repeated his statement that the Tower Bridge is the design of the late Sir Horace Jones, adding that his drawing is to be seen at the City Surveyor's office.

I am perfectly acquainted with the drawing in question, which was published in the *Builder* of 3rd July 1886, and was subsequently lent to me for exhibition at a meeting of the Architectural Association when I read a paper on "London Bridges."

Sir Horace Jones's design would have been better for greater simplicity, and especially for the omission of the unnecessary and trivial projecting bay windows or oriels at the sides in the lower portion. But in the main it is a fine and massive design, with a good deal of character about it, and it had the merit of being really what it pretended to be—a solid masonry tower.

When the engineer came to the unfortunate decision to make the towers a sham skin of masonry hiding a real construction of steel, after Sir Horace Jones's death, the design was put into the hands of another architect, who had, I believe, been Sir Horace Jones's assistant, and who was obviously not engaged or commissioned on the usual footing of an independent architect, since he was never officially named in conjunction with the engineer in any account or history of the bridge that I have seen. His position, therefore, was obviously, as I said, that of a draughtsman. He may have received orders merely to modify Sir Horace Jones's design; and people who know nothing of architectural detail may think it only amounts to that. But every architect can see that the result is that, while one or two weak points in Sir Horace Jones's design have been retained, every good quality it had has been removed and the whole thing hopelessly vulgarised. It is therefore absurd, and a gross injustice to Sir Horace Jones, to speak of the towers as they now stand as his design. As I said before, they are specimens of draughtsman's architecture.

P.S.—Since the above was written I notice that in the History of the Tower Bridge written by Mr. J. E. Tuit, M.Inst.C.E. (the engineer to the contractors), he says, in reference to Sir Horace Jones's design: "On comparing it with the structure which has now been completed, it will be seen that so many modifications have been made that practically only the principle of Mr. Jones's early design has been retained." In a structural sense, even the principle has not been retained; but the remark forms a strong independent testimony to the truth of my statement that the towers as now erected cannot be regarded as Sir Horace Jones's design, and that it is absurd to call them so.

The late Professor Banister Fletcher [*F.*].

The following note has been kindly contributed by Mr. ROWLAND PLUMBE [*F.*]:—

The late Professor Banister Fletcher was a pupil of the late Charles James Richardson, the well known architect and author of architectural books (his standard work being that on Elizabethan Architecture), and, before entering the profession, went to work at the bench and in the workshop, so as to obtain general practical knowledge of all the building trades. He began work at Newcastle-on-Tyne, at the age of twenty. From his designs, and under his superintendence, wharves, warehouses, and numerous buildings were erected there; but for the past thirty years he had practised in London. His work on *Model Houses for the Industrial Classes* (first edition published in 1871) attracted great attention to this important subject, meeting with approval from the late Lord Shaftesbury. His theories in regard to the housing of the working classes, worked out in this book and accompanied by plans for the adaptation of existing houses, with new designs, contained strong condemnation of the system of crowding numerous families into a small area as being insanitary and unnecessary. His practice as a surveyor was very extensive, and his services were in great demand as witness, arbitrator, and umpire. He was elected Associate of the Institute in 1860, and Fellow in 1876, and was a Fellow of King's College, London. He was District Surveyor for West Newington and part of Lambeth, and one of the surveyors to the Board of Trade. Elected Professor of Architecture and Building Construction at King's College, London, he carried out his idea that such a Chair should possess the advantage to students of casts, models, diagrams, drawings, and photographs, and he obtained liberal assistance from the Worshipful Company of Carpenters (of which Company he was a Past-Master), and the assistance of the Council of King's College. He (partly at his own expense) fitted up an Architectural and Building Construction Reference Museum at the College, his personal collection of large framed architectural photographs of the principal buildings of the world being perhaps unique.

He was the Chairman of the Educational Committee, and also Chairman of the Committee of Management of the well known Trades' Training School at Great Titchfield Street, which was founded and supported by many other of the City Companies besides the Carpenters'. He was also President of the British Institute of Certified Carpenters. Besides having done much to popularise architecture, as the only means of educating popular taste to an appreciation and love for the beautiful, by the delivery of lectures at public institutions, he has also written standard text-books on various subjects.

His professional work did not exhaust his energies, for he was a member of the Common Council of the City of London, Colonel of his Volunteer Regiment, and a recipient of the V.D., besides being a Deputy-Lieutenant and Justice of the Peace for the County of London. The Professor was also Past-Chairman of the Sanitary Committee of the City of London, and of two International Building Trades' Exhibitions at the Agricultural Hall, Islington. He was President of the Engineering and Building Construction section of the Congress of the British Institute of Public Health, held in 1894, and was Hon. President of the 10th section of the International Congress of Hygiene and Demography at Buda-Pesth in 1894. He sat in the 1885 Parliament for North-West Wiltshire, having wrested the seat from Lord Arthur Somerset. At the General Election of 1892 he narrowly missed winning Bournemouth from the Tory camp.

Associated with him of late years in a large and varied practice have been his sons, Mr. Banister F. Fletcher and Mr. H. Phillips Fletcher. Either on his own account or in conjunction with them, he was responsible for the erection of numerous residences, chapels, schools, restaurants, shops and business premises, factories, flats, and model dwellings. He also laid out several important metropolitan estates.

He was a zealous antiquarian. His collection of wood carvings and works in wood, comprising little bits from Florence, Normandy, Athens, and others from old City houses of no particular character beside their own charm, although small, is unique in character. Wherever he went, either at home or abroad, he was always on the search to increase his collection. Although such a busy man, he found time for a considerable amount of travel, and visited most of the Continental shrines of art, including Greece and Constantinople.

His death, at the comparatively early age of 65, was somewhat sudden, and was due to tuberculosis of the lungs.

I have had the advantage of the Professor's acquaintance from my earliest manhood, an acquaintance which ripened into a social friendship of many years' standing. His indomitable energy and vitality always impressed me. The calls upon his time and endurance occasioned by his large and varied practice never prevented him from throwing himself with his whole heart into the honorary work he did for the advance of technical science in the interests of the working classes. I think I am justified in saying that all his life he did the work of two men; and I have no doubt, considering his iron physique, that, had he worked moderately, he would have lived to a green old age. Socially, he was one of the best of hosts and a most kindly man, delighting in and beloved by his family circle, and always ready to assist those who went to him for help. In business I always found him full of resource and tact, with a wide knowledge of men and affairs. Walking side by side with him in professional life as it were, I have no hesitation in stating that he sacrificed his vitality to his real love of work for its own sake. There is no doubt that in his professional zeal he exerted himself to a point beyond ordinary endurance. He died absolutely in the midst of his work, and never realised that his time had come, as during his short illness he was, even on his sick-bed, engrossed in the actual work of his profession. In this he was happy, surely; he literally died in harness. How much better is an end like this to a man of his disposition than that of a man who lingers on in ill-health, or who rusts out in a long life of incapacity!

Mr. Arthur Cates [*F.*] writes:—

Apart from the excellent service which Professor Banister Fletcher rendered to the young professional man, by embodying in concise and handy forms the results of his great experience on Dilapidations, Compensations, Arbitrations, Light and Air, and the like subjects, which bristle with difficulties for the young man commencing practice, his memory should be highly esteemed for the persistent and successful efforts which he made to improve the system of architectural education. As Professor of Architecture at King's College, he did not content himself with a course of lectures, more or less profitable to those who attended them, but added what would ultimately become a complete course of study for architectural aspirants, with day and evening classes and demonstrations; and to supplement these he made at his own cost valuable collections of photographs and illustrations of architectural monuments and models of construction, which he presented to the College.

As a Past-Master and an influential member of the Court of the Carpenters' Company, he was able to obtain from the funds of that Corporation most liberal grants for the advancement of the classes at King's College—grants which were also extended to University College, and enabled Professor Roger Smith to establish classes at that institution somewhat similar in aim to those which Professor Banister Fletcher had established at King's College. Mainly through his influence the Carpenters' Company have done noble work in aiding technical education in connection with their Guild—greatly to the advantage of the architect—in improving the training of the workman and giving him a higher ideal to aim at than the common one of getting the greatest possible pay for the least possible amount of work.

Although he has unfortunately been cut off just as the scheme so carefully elaborated was beginning to bear fruit, and when the Teaching University for London, to which these two colleges would be affiliated to help to place architectural education on a satisfactory basis, was about to be established, due honour and credit should be paid to his memory for his indefatigable and unselfish exertions in this direction—the liberal support he himself gave to the institution he represented, and that liberal contribution which he was influential in obtaining for the same end from the great City Company with which he was associated.

Professor T. Roger Smith [*F.*] writes:—

The late Professor Banister Fletcher and I were brought together, upwards of thirty-five years ago, by the Architectural Association, and never lost sight of one another since. We were thrown together during the last twelve or fifteen years by our connection with the Carpenters' Company, in its endeavours to utilise its resources, pecuniary, personal, and material, for the advancement of technical education. He showed a courage amounting almost to daring in the proposals which he brought before the governing body, and was indefatigable in his efforts to secure the success of the undertakings which he originated. We two formed a sub-committee for the management of the course of public lectures on subjects connected with building, of which three series have been given each year, as well as for the conduct of two examinations annually. Into all this, and much else, he threw himself with great energy and spirit. He succeeded in interesting many men of position and culture, and inducing them to aid us in the conduct of the examinations or as lecturers; and he was unwearied, literally up to the last weeks of his life, in the personal attention which he gave to this work. The "Trades' Training School," which is conducted by several of the City Companies, each giving technical instruction in that trade from which it derives its status, will remain as an abiding and very valuable result of an energy and devotion which will be greatly missed by those who were his colleagues in the conduct of this work.

REVIEWS.

THE TOWN-HALL, PERUGIA.

Sulla Scala Esterna del Palazzo del Popolo. Osservazioni svolte dal Relatore Alessandro Bellucci davanti al circolo della Riunione Artistica di Perugia il giorno 27 Novembre 1898 *nella sede sociale.* (*Con piante e disegni illustrativi.*) *8vo. Perugia,* 1899.

The oldest portion of the town-hall, or Palazzo del Popolo (also called dei Priori and del Podestà), on the Piazza San Lorenzo, at Perugia, dates from the latter end of the thirteenth century (1279–1298), the first architects employed having been natives of Perugia—Fra Bevignate, a Sylvestrian monk, and Messers Giacomo di Servadio and Giovanello di Benvenuto. The design of the building has been attributed by some to Giovanelli da Gubbio, who is also said to have designed the public fountain and the fortress of the Porta Sole; but the people of Perugia, impelled by patriotic feeling, claim these works (that is to say, the town-hall and public fountain) for their countryman Fra Bevignate (1260–1350), a Benedictine monk, and architect to the town.

According to Murray's *Handbook of Central Italy*, the town-hall at Perugia was designed (1333) by Gianello di Maffeo (so called by Moroni), or Matteo di Giovanelli da Gubbio, nicknamed *Il Cattapane*, or the Beggar (from *cattare*, to obtain by fawning, and *pane*, bread—not *Gattapone*, as in the *Dictionary of Architecture*, which is without meaning), who also designed (1332–49) the Palazzo del Comune at Gubbio, and in 1371 the fortress of the Porta Sole—but this is clearly an error.

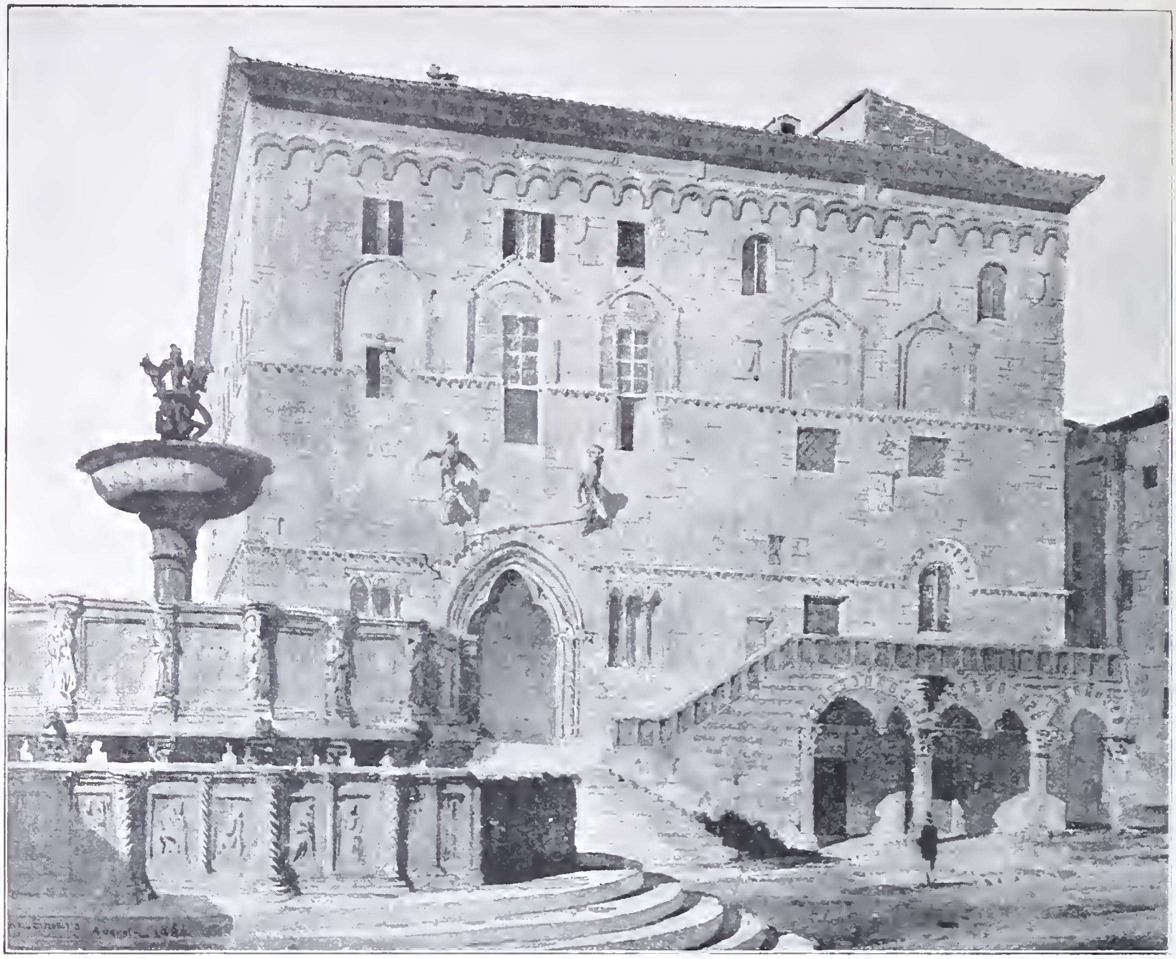
It appears to be established by Professor Alessandro Belucci's researches, that in 1279, according to a communal edict of that date, the Captain of the People dwelt in a certain messuage adorned with towers situate to the westward. This building fronted on the Via della Gabbia, and formed the oldest portion of the present town-hall, which was afterwards called the Palazzo del Popolo. In this same year the Podestà was empowered to acquire the ancient building in which the Captain of the People resided and administered justice, for the purpose, as it would appear, of constructing a new palace on the site. In 1298 the first portion of the town-hall was completed, and in 1338–9 it was enlarged by the addition of the galilee and nave of the church of S. Severo adjoining to the north-west, which was incorporated with it. Giovanelli da Gubbio may perhaps have superintended these additions, but not the original structure.

On the north side of the town-hall at Perugia, fronting towards the Piazza San Lorenzo, was, until recently, an external staircase of peculiar design. This staircase formed no part of the original structure, but was erected in 1832 by the then communal architect Antonini, to replace a staircase which was condemned by a resolution of the municipality as being dilapidated and out of harmony with the style of the building. A few years ago, according to Professor Belucci, a few Perugian artists, together with some cultured laymen, resolved to obtain the removal of this staircase and to rebuild the staircase with a double flight of steps, the design of the new staircase being supplied from certain indications in contemporary frescoes and engravings. This was eventually done, but the new staircase is a temporary structure of wood.

Professor Belucci's pamphlet is an energetic protest against this tampering with an ancient building, which he shows by numerous illustrations and quotations from original documents to have been entirely unnecessary and unjustifiable. It was asserted by the advocates of the so called restoration (which the Professor contends is in no sense a restoration, but a new work) that the staircase destroyed in 1832 had a double ramp, and that it is so represented in a fresco by Bonfigli in the Pinacoteca; but our author shows by a tracing from this fresco, in the appendix, that the slight indications in the fresco do not bear out this contention, and demonstrates by a closely reasoned argument, which must carry conviction to an impartial mind, that the staircase of 1832 more closely resembled the original design than the purely imaginary work by which it will be replaced. It appears, however, that the citizens of Perugia were bent upon adorning their town-hall with a staircase in imitation of that in front of the town-hall at San Gemigniano, which is believed to be unique in Italy, although not uncommon in the Low Countries, and no appeal to reason could turn them from their resolution.

As an illustration of the carelessness of some writers with regard to architectural matters I may refer to a passage in *The Story of Perugia* in Dent's "Mediæval Towns Series," in which the authors say, "A splendid open-air staircase leads up to the north entrance of the palace, which is, perhaps, the most impressive architectural point in all Perugia. Some years ago this fine outer staircase was pulled down; but it has been rebuilt with extreme care and taste, and probably exactly on the original lines" (p. 117). This is precisely what has not been done, as is evident from Professor Belucci's description.

The town-hall at Perugia has suffered severely at the hands of the restorer, as will be seen by a comparison of a water-colour drawing made in 1864 by Mr. R. Phenè Spiers (to whom the Institute is indebted for permission to reproduce the drawing) and a recent photograph [pp. 526–27]. Perugia, as is well known, was the stronghold of the Guelph faction, whose arms are displayed in different parts of the town, and was the scene of frequent partisan struggles. Up to the middle of the seventeenth century, according to Crispolti, who wrote in 1648, the walls of the town-hall were surmounted by battlements, which were removed and replaced by a classic frieze and cornice, which in turn were removed, and the battlements replaced, as we see them at the present, the design being apparently taken from old engravings. The removal of this frieze and cornice was clearly a mistake, and cannot be justified on either historical or æsthetic grounds. As Mr. Spiers's drawing shows, the building was a dignified and appropriate composition, so much so that it is difficult to realise that there is an interval of four centuries between the date of the cornice and the rest of the building. Referring to the mediæval addition of the so called Scala battlements to the Roman arch at Rimini, Professor Freeman says, "We will remark in passing that this change is part of the history of the building and of the city, and we trust that no reformer or restorer will ever wipe out this small page of Italian history by pulling down the mediæval crest of the Roman arch" (*Hist. Sketches*, p. 142). The same remark will apply more or less to the removal of the classic frieze and cornice of the town-hall of Perugia, by which a small page of Italian history has been wiped out. In the Middle Ages the battlements of the town-hall had a use and significance as a means of defence and an emblem of the Guelph faction, but by the middle of the seventeenth century they had no longer any use



THE TOWN HALL, PERUGIA, 1864. (From a water-colour drawing by R. Phené Spiers, F.S.A.)

or significance, and they were accordingly pulled down. To replace the battlements in the nineteenth century is an anachronism.

Professor Belucci's pamphlet is a monument of erudition and patient research, and is a gratifying proof of the intelligent appreciation by the educated class of Italians of the value of their historical buildings.

JOHN HEBB.

LEGAL.

Contract: Extra Work: Delay in Completion: Right to Penalties.

DODD *v.* CHURTON.

The decision of the Court of Appeal in this case, given on 19th March 1897, settled a point of building law as to which there had hitherto been some uncertainty. The case is of much practical value as showing the need for well-considered conditions in building contracts. Under the Institute Schedule of Conditions the parties probably would never have gone into Court at all, as Clause 25 empowers the architect, in case of extra work being required, to make a fair and reasonable extension of time for completion. A member having inquired as to the facts of this case, the following abridged report has been made from the *Law Journal*, 66 Q.B. 477.

The case was an appeal from the judgment of a Divisional Court affirming the judgment of the judge of the County Court of Shropshire.

The action was brought by the plaintiff, a builder, to recover the balance due to him under a building contract. The defendant, the building owner, counterclaimed for £50 as liquidated damages for delay in the completion of the contract.

By the contract the plaintiff agreed, in consideration of a sum of £664, to execute and complete certain work set forth in a specification, subject to the general conditions annexed to the contract. The general conditions contained, amongst others, the following clauses:

"1. The whole of the works, and any other works that may be ordered as additions to this contract, are to be executed and completed in the best and most workmanlike manner, and with the best materials of their several kinds, and everything to be done to the full spirit and intent of

THE TOWN HALL, PERUGIA, AS RESTORED. (From a recent photograph.)

this contract, which is intended to comprise everything necessary to the perfect completion of the works."

"2. Every part of the works to be done to the satisfaction of the architects, and their directions to be followed in every respect, and their opinion on all questions relating to the works or contract to be final and conclusive."

"4. Any authority given by the architects for any alteration or addition in or to the works is not to vitiate the contract; but all additions, omissions, or variations made in carrying out the works, for which a price may not have been previously agreed upon, are to be measured and valued and certified for by the architects, and added to or deducted from the amount of the contract, as the case may be, according to the detailed schedule of prices on which the contract was formed."

"24. The building to be ready for the roof timbers by 1st May 1892, and the whole of the works to be completed by 1st June 1892, under a penalty of £2 per week for every week that any part of the works remains unfinished after that date, as liquidated damages."

The defendant ordered additional works to the amount of £22 8*s.* 8*d.*, which necessarily prevented the plaintiff from completing the work by the specified date. The works were not completed until twenty-seven weeks after the specified date, and the defendant, allowing the plaintiff two weeks' time, within which he might reasonably have completed the additional works, counterclaimed £2 a week for twenty-five weeks as liquidated damages for the delay.

The County Court Judge held that the defendant, by ordering the additional works, had waived the stipulation providing for penalties for delay, and he gave judgment for the plaintiff on the counterclaim. Upon appeal to the Divisional Court (Justices Wills and Wright), the Judges differed in opinion, Mr. Justice Wills holding that the decision of the County Court Judge was right, and Mr. Justice Wright that it was wrong. The County Court judgment, therefore, stood.

The defendant took the case to the Court of Appeal, where it was heard by the Master of the Rolls (Lord Esher), Lord Justice Lopes, and Lord Justice Chitty.

The case was argued before their Lordships by Mr. E. H. Lloyd, for the defendant, and Mr. Loehnis, for the plaintiff.

Lord Esher, in delivering judgment, said that the question depended upon whether the building owner had or had not disentitled himself to recover the penalty by reason of his having ordered certain extra work to be done beyond the original work set forth in the specification. It was admitted that the extra work ordered obliged the builder to take more time in executing the work than if he had merely to execute the work originally specified. Under the contract the building owner had the right to require the builder to do the extra work, and the builder was obliged to do it. It was obvious that if the performance of the extra work increased the time necessary for doing the work, it would be unreasonable to force the builder to do the original work in the agreed time, or pay the penalties if he failed to do so. One rule of construction as regards contracts was that the Court would be unwilling to adopt a construction which would lead to an unreasonable result. The case relied upon by the defendant—*Jones* v. *St. John's College, Oxford*—was different. There it was alleged in the pleadings, and admitted by the demurrer, that the builder had agreed that if extra work was ordered he would undertake to complete the works within the time originally specified. The Court therefore held that, as the builder had agreed to do this, he was bound by the agreement. The contract in the present case contained no such agreement. It amounted to nothing more than an agreement by the builder to give the building owner the right to order extra work, in which case, if the building owner by ordering the extra work prevented the builder from completing the work by the specified date, he deprived himself of the right to claim the liquidated damages for delay. For these reasons he thought the judgment of Mr. Justice Wills was right, and that the appeal must be dismissed.

Lords Justices Lopes and Chitty gave judgments to the same effect.

Architects' Fees.

MANTON *v.* TROUNCER CO. & BURDASS.

At the Wolverhampton County Court, on the 18th July, his Honour Judge Young had before him an action brought by Messrs. Manton and Son, architects, Wolverhampton, against Messrs. Trouncer Company, Limited, brewers, of Shrewsbury, and Mr. Burdass, a member of the firm, for the recovery of £21 17*s.* for the preparation of plans and specifications, and also for work done in relation to certain tenders, quantities, &c. Mr. Haslam appeared for the plaintiffs, and Mr. R. A. Willcock for the defendants.

The plaintiffs averred that Mr. Burdass gave Mr. Manton, sen., instructions to prepare plans and specifications for certain alterations and improvements in connection with premises at Compton. The price agreed to was 5 per cent. After plaintiffs had done the work the proposed alterations were not proceeded with. There was a dispute over the amount of the bill, and plaintiffs claimed, as the work had not been carried out, £15 6*s.*, which was 3½ per cent. on £437, the lowest tender, and £6 11*s.* or 1½ per cent. for the getting out of quantities, &c. Defendants paid £10 18*s.* 6*d.* into Court as a fair sum for the work done, being half of the 5 per cent. which plaintiffs agreed to do all the work for.

Mr. Manton admitted in his evidence that before plans were approved by Mr. Burdass he had communicated with the builders. He had never advertised for tenders; he asked three builders to send in tenders.

The Judge observed that Mr. Manton seemed to have assumed everything; assumed that the plans would be approved; assumed that the work would be proceeded with; and further assumed it would be necessary for him to put himself into communication with the builders. In the ordinary course all that would come after the approval of the plans.

Mr. Manton said that Mr. Burdass saw the plans on a certain date, and after witness had made some alterations he approved of them.

Mr. Burdass, in his evidence for the defence, said he gave instructions for the plans. Mr. Manton agreed to do the "whole thing from beginning to end" at 5 per cent. He asked Mr. Manton for a rough pencil sketch, and said that he could not pass the final plans until they had been approved by his principals. He never gave instructions for tenders or estimates to be got out.

Mr. Beck, architect, a witness for the defence, said in contract cases where the work was not carried out after plans and specifications had been concluded, half the commission should be charged.

His Honour, in giving judgment for the defendants, said the case was dependent upon its own particular facts.* Everyone knew there were certain rules of the Institute with reference to architects, but no one would contend that an architect was not entitled to make a contract on any footing he thought fit. In this case it was agreed that the whole of the work should be done for 5 per cent. It was well known by the parties when the contract was made that the plans and specifications might not be acceptable to Mr. Burdass, and it was quite competent for Mr. Manton when he entered into the contract to have stipulated that he would charge 5 per cent. if the plans were accepted and work undertaken, but that if it was cut off after he had prepared plans and specifications he must charge 3½ per cent. Mr. Manton had not done so, but bound himself to do the work for 5 per cent. throughout. He had come to the conclusion that the £10 18*s.* 6*d.* which had been paid into Court was sufficient payment. He hoped some arrangement might be come to by the solicitors whereby plaintiffs could be relieved of the costs.

ROWE *v.* JONES.

In the same Court on the same day, Mr. R. J. Rowe, architect, of Bilston, sought to recover from Mr. Edwin Jones, of Bilston, the sum of £62 14*s.*, architect's fees.—Mr. Dallow appeared for the plaintiff, and Mr. R. Tildesley for the defendant.

The plaintiff stated that in January, upon the instructions of defendant, he surveyed a piece of land on the Wolverhampton Road, Bilston. Defendant said he wanted to erect four houses, and plaintiff gave him the scale of architects' charges. He told defendant that the usual charge for getting out plans and superintendence was 5 per cent., to which he answered that "it was all right." As there were three houses alike he told defendant he would do the work for 4 per cent. On the 6th February defendant called on him and altered the size of each house, in consequence of which he prepared fresh drawings. At defendant's instruction he prepared plans, which were returned on the 18th February, fully approved. Plaintiff obtained the quantities from the quantity surveyor, and tenders were solicited. The lowest tender was £2,090. Defendant took the list of tenders away with him, and his brother fetched the plans. Defendant and his brother afterwards told him that they did not think it would pay them to build the houses for the price named, and defendant asked if plaintiff could reduce the amount to £1,700, and if so he might go on. He replied that he did not think he could reduce the amount more than £150 or £170. As defendant left he said, "I will get them done for £1,600." He supplied defendant with the quantities, and heard no more about it. In June he received a letter from defendant, in which he said: "I have fully made up my mind not to build, as I cannot see my way clear to put up the houses to make them pay. Please let me have my bill by return of post." He sent in his bill for the amount claimed, but it had not been paid.

Mr. W. J. Oliver, architect, gave it as his opinion that the charges made were fair.

Mr. Tildesley said the case for the defendant was that there was a distinct bargain that plans should be prepared for houses which were not to cost more than £1,600. The plans got out, however, were for considerably above that sum, and were, therefore, absolutely useless. His client was still willing to pay a reasonable sum for what plaintiff had done.

His Honour said that the whole history of the matter, from the time when the plaintiff began to work up till the time when the defendant abandoned the idea of building, tended very strongly in his opinion to the view that there was no stipulated sum agreed upon at the time when the plaintiff was originally employed. He had come to the conclusion that the plaintiff did agree to do the work at 4 per cent. He gave a verdict for the plaintiff for the sum claimed.

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* These are fully set out in a report of the case in the *Midland Counties Express* (Wolverhampton), July 22.

ON THE USE AND VALUE OF COLOUR IN ARCHITECTURE.

BEING THE ESSAY AWARDED THE INSTITUTE SILVER MEDAL 1899.

By Hubert C. Corlette [*A.*],
OWEN JONES STUDENT 1896; INST. ESSAY MEDALLIST 1899.

Illustrated with Photographic Reproductions of Drawings by the Author.

PART III.

GRÆCO-ROMAN REVIVAL.—With the Renaissance of the fourteenth and fifteenth centuries came many elements new to the mediæval mind, though old in the history of human thought as it had been expressed in written literature, or in that literature of art, decorative colour.

The flood of Pagan thought was poured out upon the lukewarm faith of Christendom as much by the aid of Medicean patronage as by its cause, the Saracenic conquests. The influx of an old philosophy, when it had been gratefully received by European scholarship, necessarily sought expression in such language as it could command. Philosophy has its place, but not at the cost of faith; for faith is the element by which reason itself proceeds, and if we lose one, we cannot use the other. This, art can show, is true, by the rise and fall of its own enterprise. But the Renaissance was in too many respects a new birth which was the herald of an untimely death. Before this flame, fed with the faggots brought from Greece and Rome by the collecting archæologists of the time, the light in the still living embers of mediæval art soon paled, faded slowly, and finally went out. The intensity and sincerity, the freshness and spontaneity of art gave place to the dilettante unrealities of intellectual conceit. An art grew up which had among its motives of expression things borrowed from an earlier paganism. The decorative language and the symbolic developments, the mystic fables—all the properties of pre-Christian polytheism were heaped indiscriminately upon buildings designed, or rather compiled, by a piecing together of the contents of a collector's bag, not for the uses of acknowledged polytheists, but for those of professing successors and upholders in a later era of the great principle passed on from the monotheistic Semites. Hypocrisy in mind brought hypocrisy into the means it found for expressing itself in colour, that vehicle of the didactic language of art.

With the beauty of idea contained in the mythological conceptions which the Greeks, for instance, had left as a legacy to the world, we do not quarrel. But where motives and themes germane to one faith and its expression in art, but foreign to another, are foisted upon that with which it has not, and never can have, any immediate relation, this surely is not only misleading but absurd.

Notwithstanding the fact that such a flagrant lack of principle is traceable in the decorative arts applied to Christian uses during and since the Second Renaissance, this new school in art gave us many fresh developments. With the political and ecclesiastical principles of which it was the herald we can only deal slightly, in so far as their presence has affected the practical, poetic language of art. The expression of this poetic language in decoration is the highest and the ideal function of colour in architecture; and when we have realised that this should be so, then and only then shall we be even partially enabled to realise what is the value of colour in architecture, having first learnt to know its elementary and final use.

But from a consideration of principle, let us leave the abstract and see what practice can show in the examples that have been preserved. For the study of principle and practice in literature, whether it be in the form of scientific or artistic expression, may not be dissevered without permanent damage to both.

Numerous examples of Renaissance painting could be cited which, though used with the intention of decorating architecture, do not do so because they have missed the first aim that all true decoration must have before it.

There are churches and palaces in Genoa, to name one place only, where painting has been done that is not decoration at all. The Church of the Annunciation is a vulgar, over-gilded place, with pictures in frames, high up above all heads, on the ceiling, where as pictures they are useless, and as decoration they are mere dark spots whose meaning no gazing will unravel.

St. Peter's, in Rome, has much colour distributed on its mighty interior, but it has little real merit as decoration. There is no apparent unity in it as a scheme of colour, and though it begins to tell occasional tales, it does not recite a complete story.

Much of the skill Buonarroti exercised upon his work in the Sistine Chapel is never appreciated because it is so distant from the nearest point from which it is likely to be seen. And this labour is a waste because of its useless expenditure, for though it may improve his work as a picture, it lessens its power as decoration. The work by the painter on the eastern wall of the same chapel is a black picture of a hideous subject, having no colour to relieve the intensity of its horrors. No doubt the subject may have dictated the treatment. But if so, was it necessary to select such a theme for the decoration of the most sacred part of a building, where life, with the loveliness of hope, should be taught, and not the contemplation of death and hopeless despair? It seems a pity that two works by a colourist like Perugino should have been destroyed in order to let the unwilling Buonarroti begin a fresco at the age of sixty, in completing which he was to take seven years.

Raphael's work in the Stanze at the Vatican gives us some beautiful examples of pictorial representation which admirably fulfil the purpose of decoration. It is all wonderfully finished, finely composed, and beautifully drawn. Its colouring is sufficiently pure to tell in a decorative way, and as it is so close to the eye, the most careful details, the most subtle modellings, are all of value. Nothing could be taken from or added to this work except to diminish its effect and spoil its power. The chief question that arises in our minds when seeing parts of it is, whether it is advisable to paint finished pictures on a ceiling, even though so close to the spectators' eyes.

This Second Renaissance as distinguished from the first, which began in the eleventh century, was necessarily far removed, in its use of colour, from that which had preceded it. The mediæval schools of painting in Italy had developed the use of tempera and fresco. They had used also the mosaic method so much practised by the Byzantines in the first outburst of Christian art. But with the revival in the fifteenth century came the introduction of the oil medium, full of new powers, and carrying with it, as was soon discovered, new opportunities and, till then, unknown effects.

With this, the so-called Classic, as distinguished from the Christian Renaissance, came a break in the continuity of those traditions by which the mediæval method had been carried on from the earlier schools of decorative art.

There are certain obvious differences between the works of those decorators who were pre-eminently colourists, designers, artists, and these later painters who were perfect draughtsmen but not always good decorators. The so-called decorative design of much that the Renaissance has given us is too natural. It too much holds a mirror up to Nature, shows her what she herself has made, and mocks by its mimicry. It does not sufficiently grasp the leading features and lose unnecessary details, bending the essentials of a thing to serve the purposes of design in colour. For the first requisites of good decoration are beauty of colour and truth of line. The value of decoration depends more upon the capacity of a design to make line and flat colour interpret form without light and shade or shadow. And the disposition of things in decorative art must, of necessity, be a conventional rendering of that which Nature shows. It should surely not be an attempt to represent so much as to interpret natural forms.

Thus we distinguish between the pictorial representations of some painters and the decorative interpretations of those painters who were also designers. The former exhibit what they have seen; the latter declare what they have conceived.

So when pictorial representations are placed where decorative conceptions should alone be allowed, failure is certain. If work in colour is to be first decoration and next a picture, it must be done subject to the limitations of decorative art. But if its intention is first to be a picture, faithfully representing some scene, it leaves the restrictions which design puts upon decoration, and then, unfettered, speaks all it has to say according to its own peculiar methods. Representation and interpretation are distinct in the parts they may play in a scheme of decoration. But though this is so, it does not imply that the use of one must necessarily mean the banishment of the other. It is desirable, however, that we distinguish between the parts that realism and naturalism shall play, as compared with those that should be confined to a conventional translation of the realities of Nature.

The position to be occupied by either method will be a guide in determining where each may be the more satisfactorily used. The strong pure colours and the vigorous lines of decorative work should be chosen for the places which shall be seen generally from a distance. They would tell in such situations, while a pictorial manner of work, with all the subtleties of delicate finish in shadowed light and toned shade, would be lost. Of what use is it to model carefully the dimpled face of a ruddy smiling child, to be seen from a hundred feet away? Would there be any value in the carefully expressed twinkle of eyes which appear really as mere darkened spots within a blot of red? Surely not! But this was the way in which the labour of skilled brushes was made of no effect in some of the cleverest works of the Renaissance. A little Greek rationalism was required to place some restraint upon the misleading facilities which clever draughtsmanship found in the new medium in which art now rioted.

If colour has been introduced in architecture with the primary desire to decorate the structure as one whole, conventional methods should be adopted. It should not be used pictorially, but in flat tones, without variations of light and shade. But it should not, at the same time, be one dull and dead piece of textureless colour.

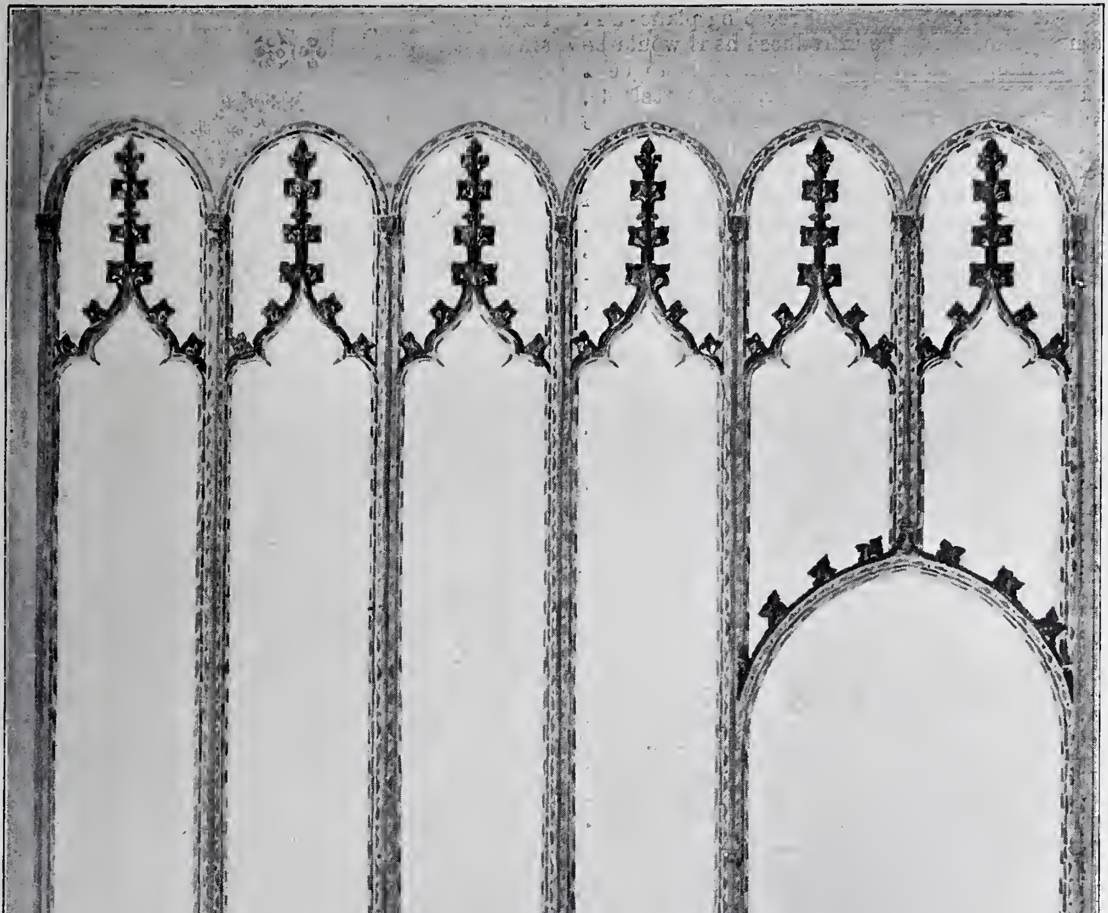

Fig. 18.—Painted and gilded Chancel Screen, 15th century, in wood and cast lead. Worstead Church, Norfolk.

Linear perspective is permissible in this method. But aerial perspective, that of receding planes and distances, should not be introduced as it would be in a painting, the first aim of which is to be a picture, a representation in colour, light and shade, of what we see in Nature. If aerial perspective effects are to be shown at all they should be produced by conventional means, not by any attempt to show things as we perceive them about us, with all their relative values of line, shade, and tone. And the way this is usually done in decorating is by using full tones and bright colours in the foreground and producing the effect and feeling of relative planes of distance by paled tones of colour, or colour reduced in intensity by the addition of grey shades. But though colour may have been introduced first with a desire to beautify by decoration, and next to lift that decoration into the higher province of art by revealing, by teaching something, it is still an accessory. Colour is essential to the completeness of any work of architecture as distinguished from simple building, even if only its aim is to please. To satisfy the natural desire for association with things beautiful is a distinct function which should be performed by colour. Used in this way as a complementary in a scheme of general decoration it cannot be regarded as a chief feature—because to say it was chief would be to define it as the head or principal of a composition. Decoration implies the execution of a general idea leading up to, or depending upon, some one central primal feature of the whole theme. One portion of a decorative idea may be the key to the whole, whether this key be decoratively or pictorially dealt with. But if pictorially, then the scheme of colour in this picture should be definitely related to that of the whole decorative idea. Then, and not otherwise, can there be a proper subordination of parts, a proportional relation of colours, by contrast and harmony, combined as one whole.

If a church were supposed, as an example, to illustrate this principle, the position for the key of the whole scheme would naturally be in or near the sanctuary. And then to this centre all the rest would be subordinate. The font, the pavements, the decoration of walls, of ceiling, the glass of the windows, the metal-work of the lamps, the carving, painted or not, of screens or other furniture—the treatment of these would point forward to the one centre of all. So, indeed, it always was in the works of mediæval days, before schismatic individualism destroyed the prevalent idea of corporate unity in the arts, as in faith and civil government. Though by this we do not intend to proclaim a desire to return either to the ecclesiastical or to the political conditions of those times; because the leading principles of the first were then generally false, or true ones falsely applied, and those of the second were undeveloped and insecure.

In deciding whether the flat treatment should be adopted for the purpose of representing the chief idea upon which the whole decorative theme depends, we are of necessity obliged to consider the material which has been selected as the medium to be employed, and the nature of the ground upon which the work is to be done. The method would largely be ruled by these considerations. Another matter by which a decorator would be guided is the position his work would occupy and the places from which, mostly, it would be seen. If it may always be viewed from only a little distance, then more finish and detail might with advantage be introduced, provided always that no detail be allowed to destroy a breadth and simplicity of treatment which in decorative work is essential. And this is important, since the value of decorative design in colour depends upon the truth and beauty of the lines in each object, and upon the purity of tone, the luminous power of each colour used.

But no amount of good drawing in the parts can infuse any real merit into a conception whose general structure is not well founded. Fine colour will not make compensation for bad drawing which might have been better, nor will good design in any way atone for an absence of harmony in the contrast of colours or for an arrangement of feeble outlines.

It does not appear that philosophical deductions can find us any regulative law of taste. The only approach to such a limit is to be discovered by an observation of nature. But such a study is not reducible to an infallible catalogue of permissible combinations, a process which may be possible to some extent in physical but not in æsthetic laws. These last are more abstract than concrete, more apprehensible in the imaginative and spiritual than in the rational part of man's being. His imagination is an essential element of that being, related to his mind, subject to his will, and influenced by his affections. But since art in its highest forms expresses supernatural or metaphysical conceptions by means of natural and physical evidences, it will be difficult to reduce its processes and results to a logical system. Imagination, which scorns reason, becomes a love of mystic foolishness; and reason, which would reduce the works of imagination to within the limits of its own apprehension is irrational.

In the course of this essay there has been little reference to examples other than those afforded by work which has been the result of some one or other religious aspiration. The reason for this limitation must be apparent. For it is a peculiar truth that the best works of art in all generations have been those produced in response to the claims of faith. And in making this statement there is no desire to overlook the fact that civil policy has also in less degree aided to produce similar monuments. But of

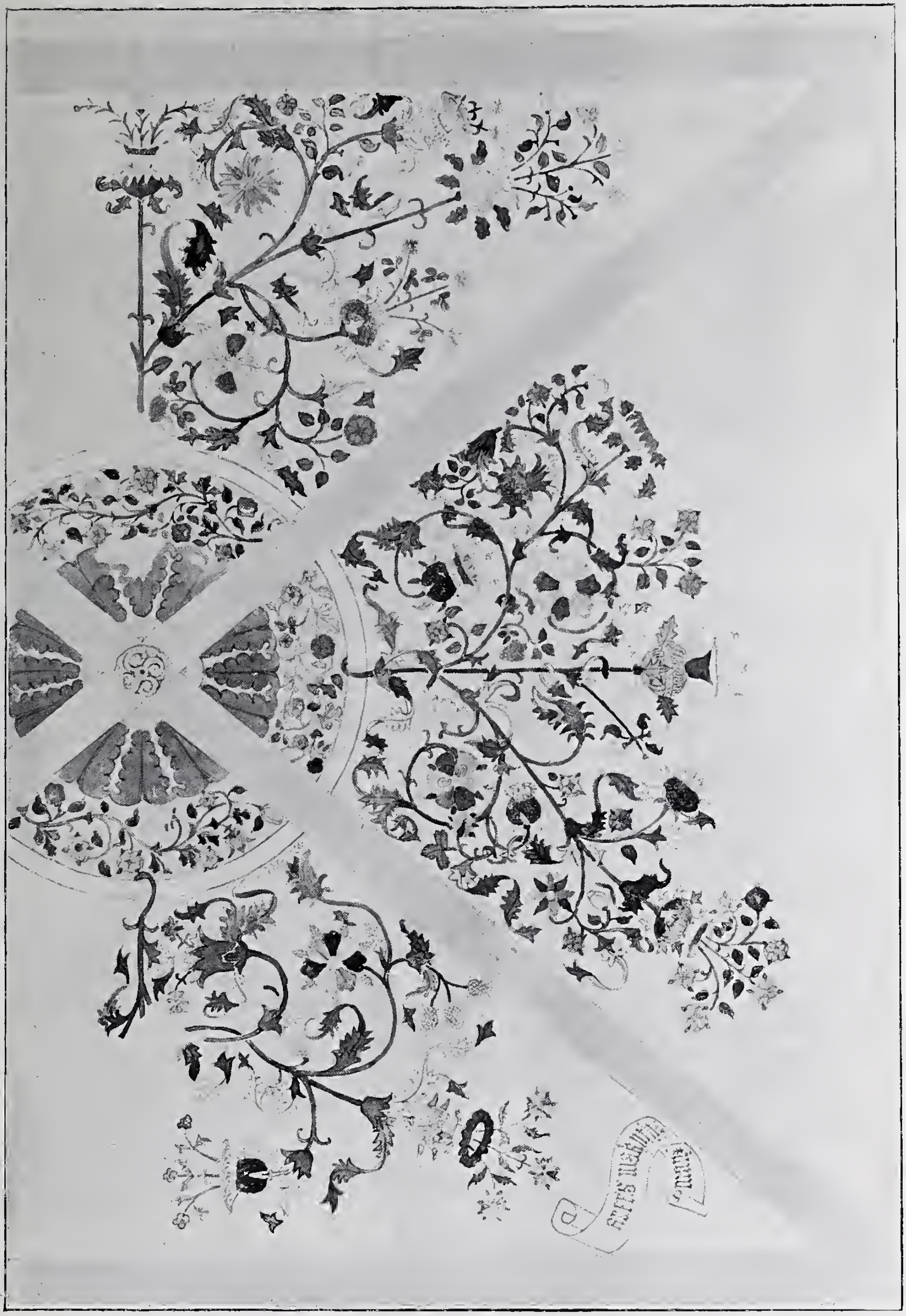

FIG. 19.—Decoration, 16th century, painted on plaster over stone. From the vault of the Lady Chapel, Chichester Cathedral.

these there have not been so many instances as the other case affords. The tombs and temples of Egypt apparently far excelled in beauty the palaces of the Pharaohs. But another aspect is presented to us in what we may learn of the buildings which rose in Babylon, in Nineveh, and in Persepolis. For here, apparently, when the world empires began to rise, much more attention was given to the production of palaces suited to the greater ideas which the support of imperial magnificence demanded. But of these structures we may know little compared with what archæology has taught us concerning both earlier and later buildings which were rather devoted to ecclesiastical than civil uses. Under the Greeks, it is true, we may learn something of art as it was applied in the service of domestic claims.

By his discoveries at Tiryns, Schliemann has traced for us rather more than the outlines of palatial architecture as it had developed at an early stage of their history. Nevertheless, though acknowledging the example of the basilicæ, we are confronted again with the fact that faith and art were, with these same Greeks, powers which clasped hands in a desire to represent the best that man could produce in a dedication of service to Deity, whether as a mythical power or a Divine Creator—a united service, which, it would appear, an excessive attention to the claims of philosophy somewhat impaired. Doubtless under the Macedonian empire, and during the time of its division, civil art had prospered more. But it is not until we approach the Roman age that we meet instances of that application of art upon an extensive scale. Of this more recent period we may know much concerning many wonderful evidences of skill devoted to the service of the State, and to that of imperious private magnificence. But since so many of these buildings were quarried in order to provide material for the Byzantine builders, little, comparatively, now remains to show what these monuments had been in their original state of undiminished splendour. But transactions in the political arena have deprived later civilisations of many of the products of preceding days. And so, excepting by the aid of what literary endeavour has told us, and what may be read on the relics that time has left, we are not so well equipped to discuss this subject from a civil and domestic as from an ecclesiastical point of view.

The same may be said concerning the periods following those which have been briefly surveyed. The one faith of Christendom in its several aspects, Greek, Roman, or Protestant, produced some of the finest work the world has seen, whether we look at the resulting architecture, which comprehends all art in unity under one name, or at some particular branches of it, as represented by mosaic, sculpture, painting, or stained glass. But to this it must be added—that art cannot live where contention thrives, nor can faith. And those sects named are not without characteristics which oppose the original purpose of art and faith. For each echoes, respectively, the principles implied, and the claims asserted, by Bildad, Eliphaz, and Zophar, who did not comprehend the larger view upheld by the younger advocate Elihu. And if we base our claims on any knowledge which is but unbalanced bias, leaning either to fatalism, expediency and rationalism, or to mysticism, we are likely to do no more than breed ignorance by conceit.

At Granada the Moors left traces of their commanding genius. And the influence of the same imaginative fire has bred its marks of power in Sicily as well as in all the East.

The revival during the fifteenth century followed rapidly when the seeds contained in Greek and Latin literature had again been sown. And these germs of an alien life were driven by winds of circumstance over all the European field. The resulting growths partook almost exclusively of forms borrowed directly from the remaining monuments of Greece and Rome. A study of the thought of those past phases of life produced similar conditions of mind in the men of that then present day. And this state of mind apparently craved for expression in forms really foreign to the civilisation and national traits of the nominally Christian as distinguished from earlier Pagan times. And thus architecture, as an indigenous and ever developing art, seemed likely to succumb in the wave by which it was so deeply flooded.

It might with some justice be said that architecture was the predominant art, the expressive literature, of Europe during the Byzantine and Mediæval periods. But with the opening of the Reformation stages we see other methods gradually taking the place of this. Modern written literature arose, and became the avenue in which the flowers of thought were nourished. At first the fresh strength of a young imagination received no check. But the cold conclusions of controversial rationalism gradually expelled the vigour and spontaneity of all fancy, and dry intellectual formality dammed the full river of original ideas in art.

The era of comparative stagnation was followed by that of revolution. This destroyed the guilds of the crafts and trades, whose aim was honest dealing and sound workmanship—a sadly different ideal from that upheld by some of their recent supplanters.

It was upon the grave of imaginative written literature that musical art began to thrive, until it became the vehicle of thoughts and aspirations which could not otherwise be expressed.

Then we have witnessed further developments in later endeavours to build up all the arts again. And thus, in spite of so much that is opposed to their healthy growth, we hope that imagination may have another chance of life. But men have ever been prone to idolise some faculty of their own being till it becomes a tyranny over themselves. They have indulged feeling and affection till it has become a licensed riot of immorality; they have used their iron will, forgetting they were bound to serve by accepting the privilege to rule; they have allowed the delightful fancies of imagination to wander into the unrealities of fantastic and fatal mysticism; and reason, their last refuge, by excess, becomes sterility.

It has been found, in examining the works of the past, that colour had always a necessary function to perform in the typical periods during which architecture flourished as a real living exponent of thought. And in these instances it is evident how closely the chief interests of individuals and communities were linked together by the services of art. The examples that have been cited helped to show the truth of those statements concerning the various purposes served by decoration, and the manner, both by structural and applied means, in which colour was introduced. These have indicated to us how, by practice, certain principles have been enunciated which we are able to adopt as our guides in any endeavour to emulate the past. But while advocating a study of the master works of antiquity, any desire to imitate, to reproduce, those works is to be deplored as an idle dependence on precedent, when we should apply the vigour of our own thought in a strong endeavour to help forward the development of man's capacity to design, so that in time the marks of beauty may be evident in all his work. Any attempt to discuss the purely technical aspect of the subject has been necessarily avoided in an essay reviewing the matter as a whole. Some few only of the more important media have been referred to in glancing at each period. In this survey there is one distinct peculiarity to be observed, namely, that in the best work of every age the fresh bright hues of the primary colours have been the dominant notes in all decoration. But by the word primary it is not intended that any inference should be drawn which would suppose that there were thus only three hues available. For the primaries each may range in hue by two directions. In the case of red, from the colour of rubies or arterial blood, until it becomes a secondary; on the one hand orange, by the domination of a golden topaz ray, and on the other violet, by mingling with the clear sapphire blue of an early morning sky. Primaries with the hues of other primaries were yet pure colour. Secondaries were most valuable, especially green, which was so frequently contrasted with red of different hues. A primary or a secondary toned with white would produce beautiful, but not so luminous, results. But the great danger to true colour was when dull minds and timid eyes, blind to the teaching of all Nature's example in decoration, were induced to mingle the sombre shades of obscuring blackness with it, so as to deprive it of all its brilliant power. Black, though a valuable neighbour, is often dangerous when in alliance with colour it is permitted to have the greater power in the combination.

The word decorator has been used throughout these pages in its old sense—a sense which implied the exercise of the highest capacities of mind, of heart, and of technical dexterity. These were linked with an imaginative mastery which under the hand of creative resource knew nothing of the modern sense, which so largely means that he who owns such a title is the willing slave of his own impotence and the ignorance of those who seek his aid.

The Giottos, the Cimabues, the Angelicos, the Bellinis, where are they in our own generation? We have painters among us, some of whom are able designers and decorators. But most of them are mere delineators who know a little of line and something of colour, but nothing at all of decoration. And these, because of the limitation to their capacity, are ever ready to question and opine when they lack the skill to suggest an idea for the improvement of that which they so ably criticise. The popular conception of an artist has been for too long confined to the supposition that he alone is one who dabbles with a brush. But we are passing out of this condition, though slowly, to a larger apprehension of what is the value of design in contrast with mere compilation. We seem to be gradually discovering what the past may teach concerning the true province of art. And we pride ourselves in teaching what we have supposed are new ideas until it is shown that the childhood even of the centuries that are gone had expressed them without conceit of their possession. Too many able men are now content to be mere pigmy imitators of the mannerisms of others who expressed their own individuality by their work. And this personal element, this characteristic epoch peculiarity, has been catalogued as "style," by teachers who would label everything, in order to provide some information as a means of easy access to what might be supposed a knowledge of the varying stages of each development of mind. But the expression of these thoughts in the concrete evidence of art should change with the temper of each time, if the pursuit of feeble custom did not evade the just claims of Nature—that it shall have fit opportunity to speak by every agent in each change of time. And since no condition of mind, no mood of feeling, is ever the same in two persons or in one individual at different times, it follows that the sign of these and the manifestation of them in the work of man must be variously shown, just as in Nature the complexion of each scene is altered by the changing conditions of every day. History teaches us that there always has been and always must be an intimate relationship between the arts if they are to possess any vitality, any lasting and effective beauty. That unity is the very essence of force and life as well as power in art and all things else we cannot doubt. And to enforce this fact, to indicate this need, we must acknowledge our indebtedness to the past if we would hope, and expect, to realise our ideals for the future. Therefore let us appeal to experience. But let not experience and precedent at any time be the limit to our hopes and aims. Alone, painting is not art, but an art merely; neither is sculpture art; nor by itself is any other dissevered member of the one family. Either one is but part of that whole in which they and all others are united. And that comprehensive whole is the all-embracing art called architecture. It is the canopy that covers, the robe that enfolds the whole family of the arts. It alone can make them one, because by nothing else can they be bound together in living and responsive unity—a unity which adds a force and gives a power to beauty which cannot by any other means be realised. This may be a dogma, but like many another it is true, simply because it is an axiom upon which as a sound foundation all the best in beauty that we know has been built. And, to borrow a dictum from an art which spoke in praise of other sisters,

> "Beauty is truth, truth beauty – that is all
> Ye know on earth, and all ye need to know."

We have now indicated the use and suggested the value of colour in architecture during various periods in which it was used, not as a thing separate from architecture, but as a fellow without which this art must ever be incomplete. It has been found that, when the Renaissance of Greek and Roman forms took place, the true principles and traditional practices of decorative art in colour were largely lost, though many new and valuable suggestions were introduced. And it has been supposed that such a loss was occasioned partly, perhaps, by a too facile power in drawing, and the unrestrained delights of painting in oil and fresco, in which the painters of that time allowed themselves to indulge.

Since the Renaissance no definite school of painters and other decorators had arisen until our own day. And now we have seen executed some beautiful work in colour. Foremost amongst all decorative artists in this revival which now proceeds, Burne-Jones and William Morris, John Sedding and Jean Carriés, have left work behind them which serves to indicate the road we all should endeavour to follow. We must not attempt to tread in the footsteps of such leaders, but we must take the road with them and work, so that by strenuous effort we may all do our share towards rebuilding the unity of art as it may be manifested in architecture alone.

Many examples, as the fruit of these changes in the methods of art, are to be seen in all directions. In the work now proceeding at St. Paul's Cathedral is one of the most important in one field—that of mosaic. The use of tapestry as a means of decorating has been again revived, among others that had been hitherto much neglected.

In Europe, some methods now practised are severely to be condemned. But in Paris, to mention only one instance, much beautiful colour and much skill has been shown in the decoration of the Panthéon. In the Cathedral at Bonn, quite recently, some decorative painting has been done equal to the best modern work.

The decoration of private houses is a subject in itself worthy of a separate essay. I have therefore done no more than allude casually to that branch of this subject.

We must now conclude our investigations, and express the hope that all who turn their attention to the use and value of colour in architecture will observe, as their guide, the pure colours of the rainbow, and take to themselves the fact that the purest hues, the truest tones of colour, for the use of all designers, are to be seen in the three elementary colours, and their offspring, which may be found united in the light of the sun's clear rays, as revealed by the aid of the prismatic spectrum.

2, *New Square, Lincoln's Inn,*
December 1898.

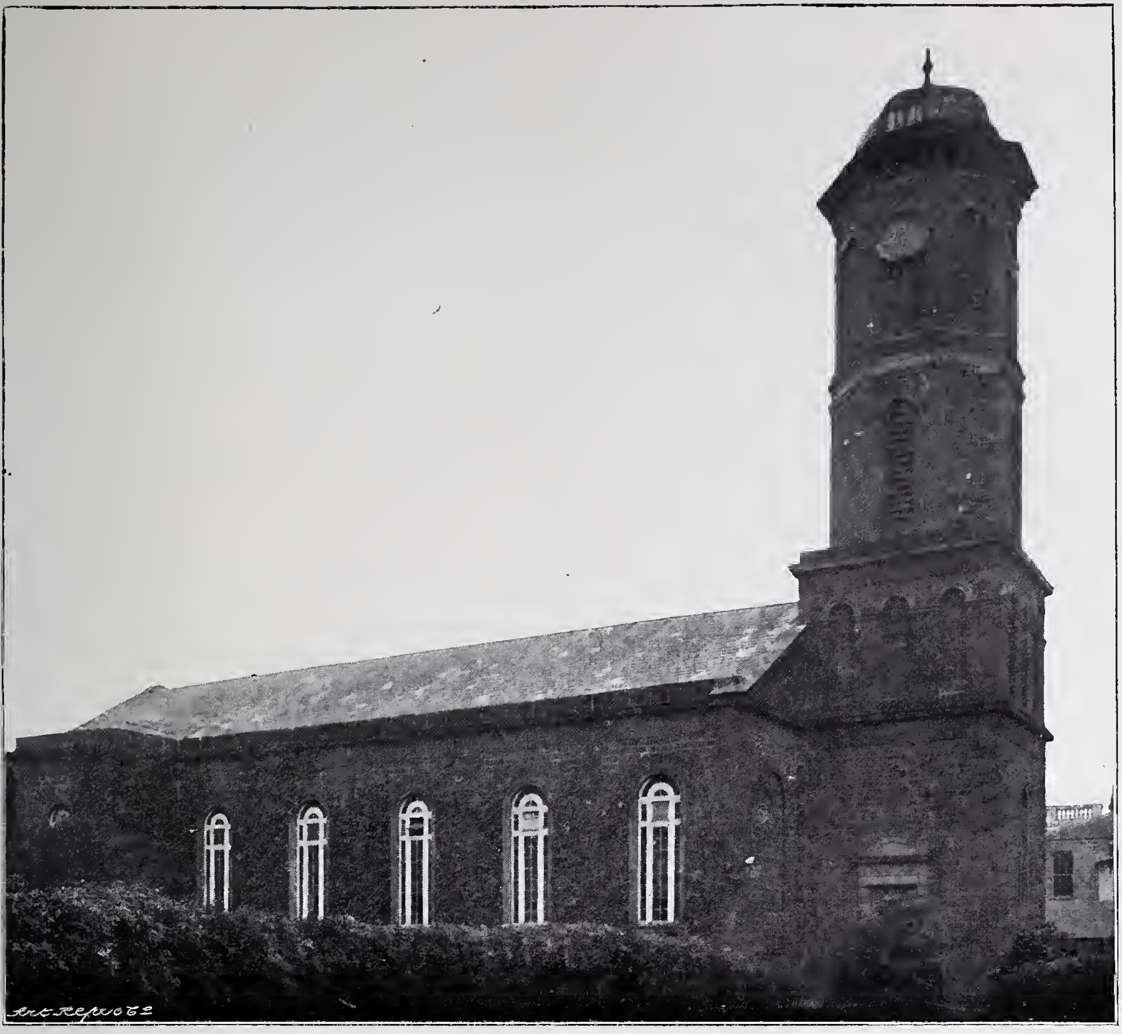

FIG. 1.—St. James's, one of the earliest churches in Melbourne, which formerly served as the Cathedral.

THE ARCHITECTURE OF THE COLONY OF VICTORIA.

By LLOYD TAYLER [*F.*],

Hon. Secretary R.I.B.A. for the Colony of Victoria.

THE rapid growth of the colonies of Australia, and the increasing concern manifested in their development, should render of interest some account of the present state of architecture in the Colony of Victoria, and of the immense strides it has taken in the erection of large and important buildings during the last few years. About ten years ago building operations in and around Melbourne, the capital of Victoria, were conducted on such a large scale, and so many extensive and costly buildings were then erected, that the metropolis earned for itself the title of "Marvellous Melbourne." Since the great financial crisis of 1893 the erection of buildings in the city and suburbs has been almost entirely suspended, and a large number of architects and builders have migrated to "fresh woods and pastures new." The effects of the crisis now appear to be slowly but surely passing away; for during the last twelvemonth there has been a change for the better—not marked by a large wave of sudden prosperity, but by movements which indicate beyond all doubt that a steady improvement has set in.

To render this sketch interesting to members it is desirable that they be made acquainted with the nature and quality of the building materials that are locally available, and that they should also be enabled, by comparing the buildings that were in existence in 1851 (the year in which the goldfields were discovered) with those recently erected, to form correct ideas, not only of the great progress made, but of the character and style of our most recent buildings.

Previous to the year 1851 the bricks of Melbourne were very inferior, for not only were they hand-made, but the clay used in their manufacture was procured from low-lying, swampy land which had been covered by the sea in the remote past, and was impregnated with salt. The consequence was that the walls constructed with these bricks were not solid and enduring; after exposure to the weather they showed signs of decay, and in humid weather the salt in them absorbed moisture from the air, and rendered the plastering on the walls damp and unsightly and the rooms unhealthy.

The want of good sound bricks prejudicially affected not only the quality of the work done, but the style and character of the architecture; for the absence of good, reliable, and easily-wrought building stone compelled the architect and builder to cover the brick walls externally with stucco or cement, and this gave encouragement (for it was a necessity) to a style of architecture which, I rejoice to say, has now fallen into disfavour; so that, with the improved bricks now available, buildings that are dependent for their decorative treatment upon the art of the plasterer are becoming rarer and are falling in public esteem. It was not until about the year 1872 that really good machine-made bricks began to be made in Victoria, and this at once gave an impetus to building operations, and led to changes in the treatment and designing of our buildings, which, I consider, have steadily improved as better materials became procurable. We have now machine-made bricks which, for colour, solidity, weight-bearing and weather-resisting qualities, are not surpassed in any part of the world. I regret, however, to have to admit that up to the present time bricks of the best finish—with perfect arrises and true faces, and fit for use for the execution of the best finished work—can only, except at excessive cost, be obtained by importation.

The emancipation of Victorian architecture from the thraldom of stucco and cement dates from the period at which good bricks became available; but the change for the better was slow and gradual, for time was needed to break down the cement and stucco practice, which had become general. Now, however, we have reached a stage at which the designs of our architects provide for the use of stone or brick, or of both, without plastering them over with mouldings and decorations in stucco; so that our progress, both in design and construction, has improved in a marked degree. Where the use of wrought stone would involve too great expense, the present practice is to use cement dressings; but these are for the most part kept plain and simple, and the meretricious effects produced by the plasterer, which a few years ago often were lavishly displayed, are now almost entirely avoided.

We have, widely distributed throughout the length and breadth of Victoria, a very valuable basalt, called "blue-stone," which is used for building purposes. It is exceedingly hard and durable, but is not easily wrought. It is highly prized for base courses, plinths, strings, steps, sills, &c., &c. But its colour is so sombre that the effect of its use in large surfaces is painfully heavy and unprepossessing. It is largely used for staircases and landings, and, being sawn into slabs, is applied throughout the city of Melbourne to the construction of the street pavements. This stone can be got from the various quarries in very large blocks, and is so abundant that, when none but inferior bricks could be obtained, it was much used in the erection of the external walls of buildings, and invariably for the foundations. It was employed in every known kind of "rubble-work." It makes very excellent "ashlar"; but, except in very rare instances, the face of the work was pitched or quarry-faced, and very seldom wrought fair. At one time it was so esteemed that all buildings of which the foundations were not constructed of blue-stone were considered inferior. This stone is nearly as hard as the best granite, and the purposes to which it is applied are very numerous and varied, for, besides being used as previously mentioned, it is in constant demand for kerbs, for pitched street crossings, for channelling street gutters, and, when broken up, for macadamising roads and for concrete. It is so highly appreciated that it is occasionally exported to Sydney, N.S.W., to Adelaide, S.A., and to New Zealand.

Victoria does not abound in good freestone suitable for building purposes, for, with the exception of that found at Stawell, in the north-west district, distant 150 miles from Melbourne, the freestone which has been found and used has not proved generally satisfactory. Nearly all the freestone required for our principal buildings has been imported from Tasmania, New South Wales, or New Zealand; and the New Zealand freestone, although of good colour and very easily wrought, is not altogether reliable in weight-bearing and weather-resisting qualities.

In the year 1851 the present city of Melbourne was little better than a village. Most of the buildings were wooden structures. The streets were very imperfectly formed and drained; the footpaths generally were unpaved; and gas for lighting the thoroughfares was unknown, so that pedestrians after dark mostly found it necessary to carry lanterns to avoid pitfalls and accidents.

The establishment of Melbourne as a town dates from the year 1842, when it was incorporated; but until about the year 1858 no buildings were erected that could claim to possess style or architectural features worthy of the name.

It cannot be a matter of surprise to anyone who considers the requirements of colonial life in the early stages of settlement that no evidences were to be found of the existence of buildings showing beauty and expression in design; for it must be remembered that at such a time no purposes but those that were strictly utilitarian could be entertained. Indeed, for many years after advancement and prosperity had been attained the utilitarian requirements pre-eminently asserted themselves, to the exclusion of the ornamental and beautiful; so that even now the former must, and do, make themselves so generally evident that the latter can only be found as the exception.

To give an idea of the unpretentious character of some of the buildings in the early days, I append a sketch of the then General Post Office [fig. 4] and also one of the Supreme Court [fig. 2], which did duty for all civil, as well as criminal, trials up to the year 1874. With each of these will be found an illustration of the present buildings in use for the respective purposes. The new General Post Office was commenced in 1859, and by successive stages has reached the development shown in the photograph herewith [fig. 5]. Since 1874 very extensive new Law Courts have been erected, somewhat upon the general plan of the Dublin courts. All the various civil courts, including the County and Insolvency Courts, as well as the Criminal Court, have been grouped into one imposing edifice; and I furnish herewith an illustration of the building [fig. 3]. I regret, however, that, owing to its position and general scheme, no single illustration can possibly give any true appreciation of its magnitude and importance. The contrast between these two old and new buildings shows, in a very marked degree, the changed conditions of commercial and official life since the early days of the Colony.

The earliest church of any importance in Melbourne was that of St. James. It was

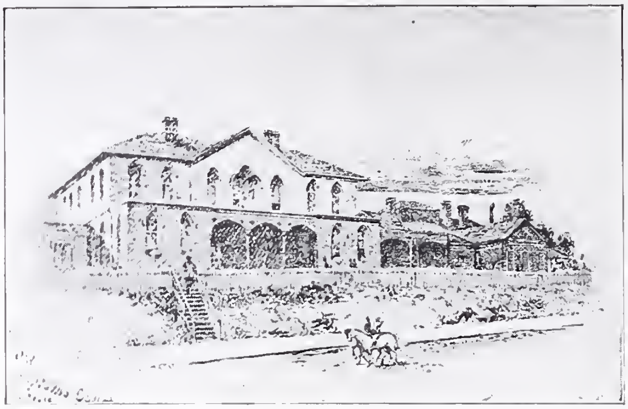

FIG. 2.—THE SUPREME COURT, MELBOURNE, IN 1851.

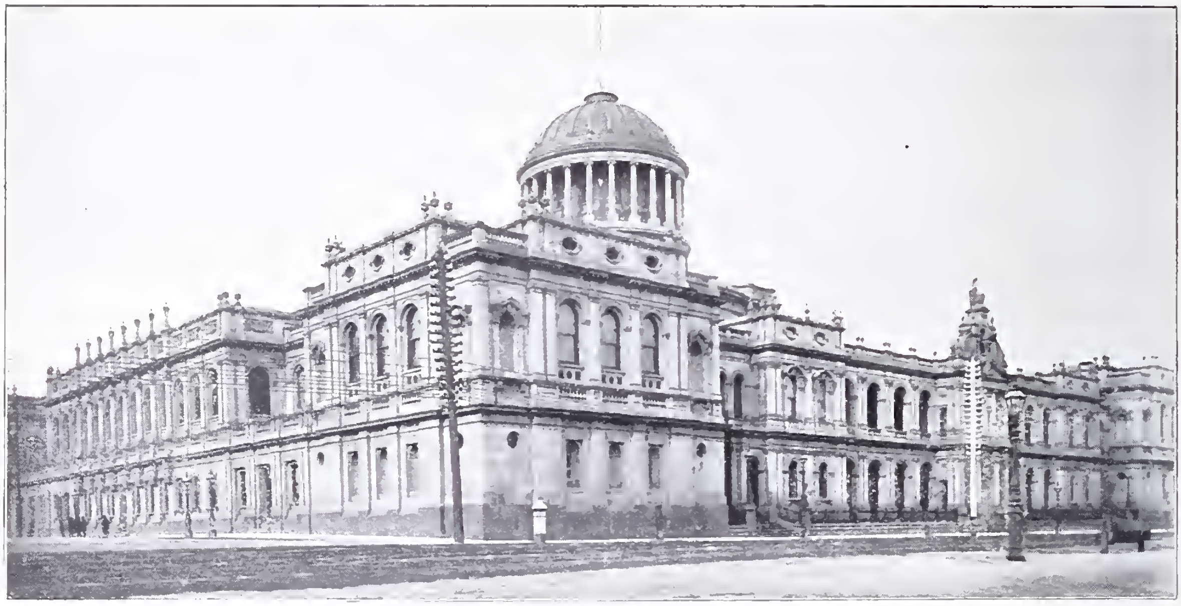

FIG. 3.—THE PRESENT LAW COURTS, MELBOURNE.

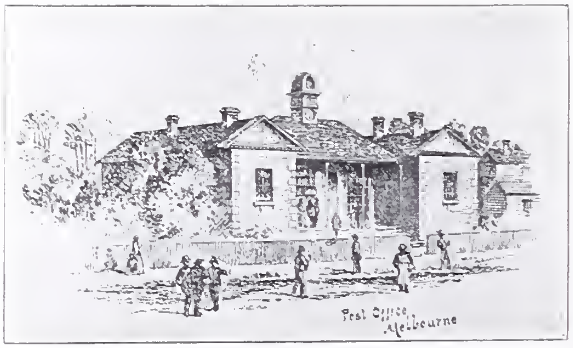

FIG. 4.—THE GENERAL POST OFFICE, MELBOURNE, IN 1851.

designed by Mr. Robert Russell, the architect and surveyor who made the first survey, and subdivision into allotments, of the town. The original design shows a tower and spire of the conventional kind; but the completion of the building being entrusted to other professional hands, it was modified so as to present the appearance shown in the illustration [fig. 1]. A spacious site in Collins Street, the principal street of Melbourne, was selected for the church, and it was erected thereon, at a considerable distance back from the street

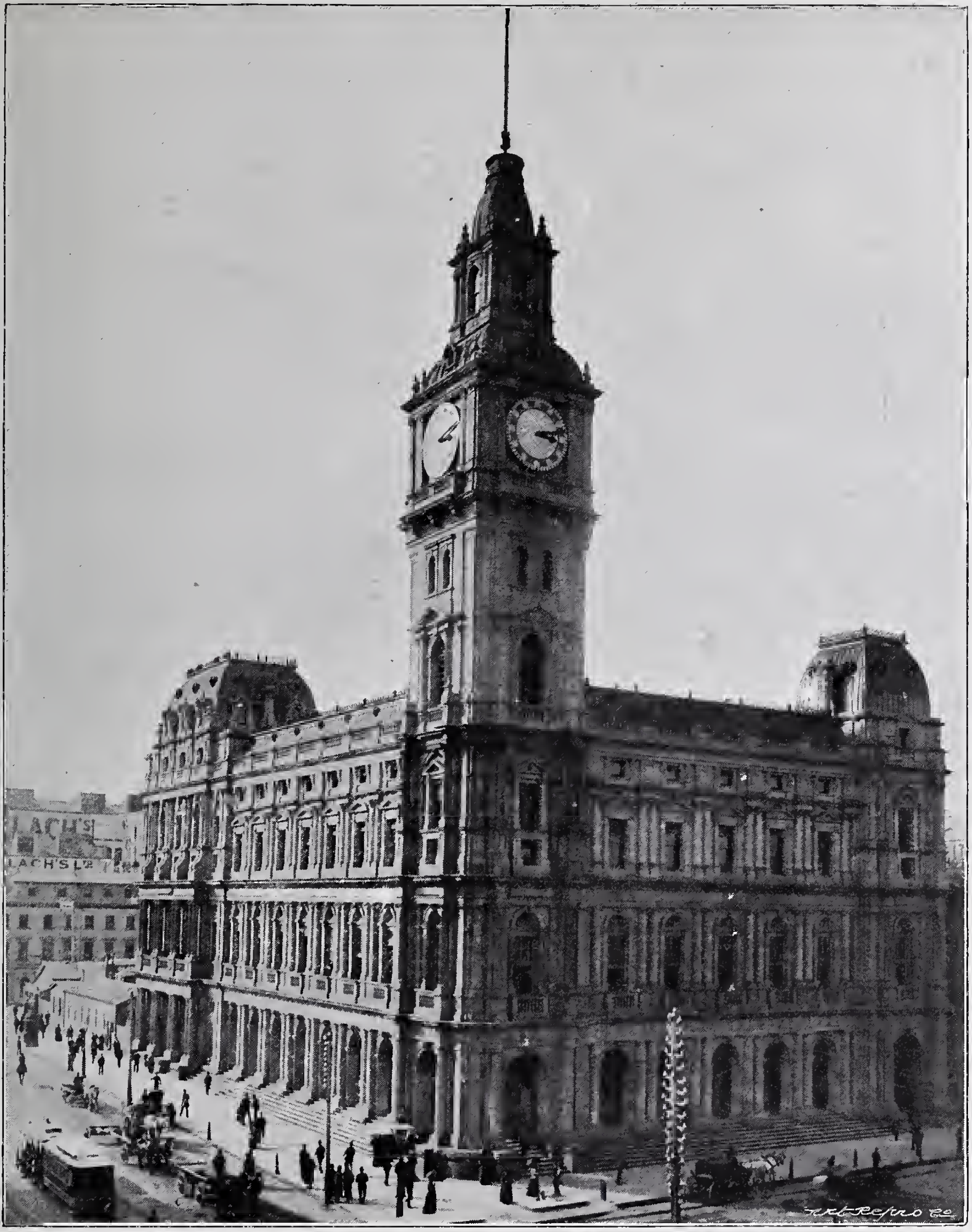

FIG. 5.—THE NEW GENERAL POST OFFICE, MELBOURNE.

alignment. For many years this church did duty as the cathedral, but as time wore on it became less important, and, as land increased in value, the frontage to Collins Street was used for the erection of business premises; and the church, being thus shut out from view, now occupies an obscure position in their rear, and its approach is now from Little Collins Street.

The Government of Victoria have largely contributed to the improvement of our architecture since the year 1851; for between that date and the present time they have caused to be designed and erected a large number of important buildings, such as the General Post Office and the Law Courts, both previously mentioned; the Government House; the Parliament House [fig. 6]; the Custom House; the Chief Secretary's Offices; the Public Offices; the Mint; the Registrar-General's Offices, &c., &c. They have all been constructed with a basement or substructure of blue-stone, or basalt, and most of them with a superstructure of freestone, though a few have the upper portion built with brick stuccoed.

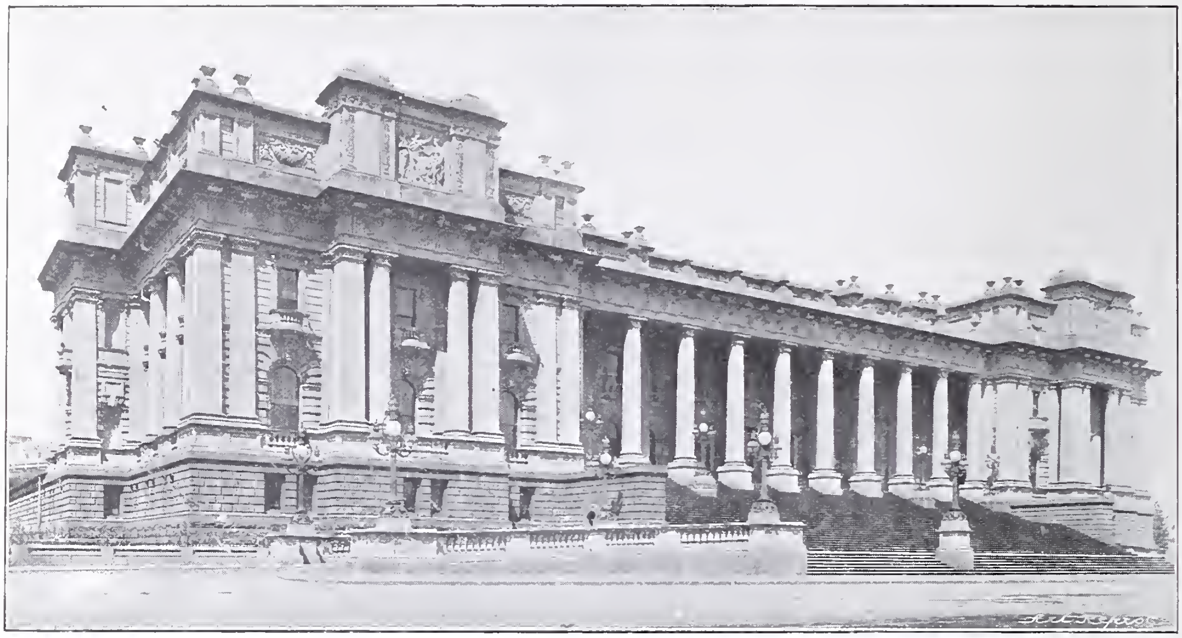

FIG. 6.—THE PARLIAMENT HOUSE, MELBOURNE.

After my short account of St. James's Church, I ought to have stated that, about ten years ago, the first portion of the cathedral proper—*i.e.* St. Paul's Cathedral—was erected. The design was furnished by Mr. Butterfield, but the works were executed under the direction and superintendence of a Melbourne firm of architects. While speaking of this cathedral, I must not forget to call attention to that of the Roman Catholic persuasion. It is known as St. Patrick's [fig. 7], and occupies a site which I consider to be the finest for such a purpose in the whole city. It is much more extensive than the Church of England Cathedral, and is built of blue-stone with freestone dressings. The only regret is that the walls on the inside are plastered, instead of being of wrought stone, as in St. Paul's. Previous to the erection of St. Patrick's, the best example of Roman Catholic buildings in Melbourne was St. Francis's Church.

The Presbyterians, as well as the Congregationalists and Wesleyans, have erected some very excellent church buildings; but I have not space in this short sketch to furnish illustrations of them.

The various banking institutions of Victoria have done much for the advancement of our architecture, by building large and costly bank premises, not only in Melbourne, but in many of the inland towns. For nearly all the banks in Melbourne the directors have called for competitive designs. Among the illustrations will be found a sketch [fig. 8] of the unimportant building in which the Bank of Australasia conducted its business in the early days, and also a photograph of the Bank's present building in Collins Street [fig. 9]. To give an idea of the enormous increase in value of land in the city of Melbourne since the date of the original sale thereof by the Government, I may mention that the present site of the Bank of Australasia is at the north-west corner formed by the intersection of Collins Street and Queen Street, and the original allotment was sold in 1837 for the sum of £40. When it was resold in 1877 it realised £40,000. The façades of the Bank of Australasia are entirely of Oamaru freestone from New Zealand, resting on a massive base-course of blue-stone. Oamaru stone is nearly white in colour, and when first quarried it can be cut almost as easily as wood. It hardens very much on exposure; but I think it cannot be relied upon for durability with the confidence that can be given to Sydney or Tasmanian freestone.

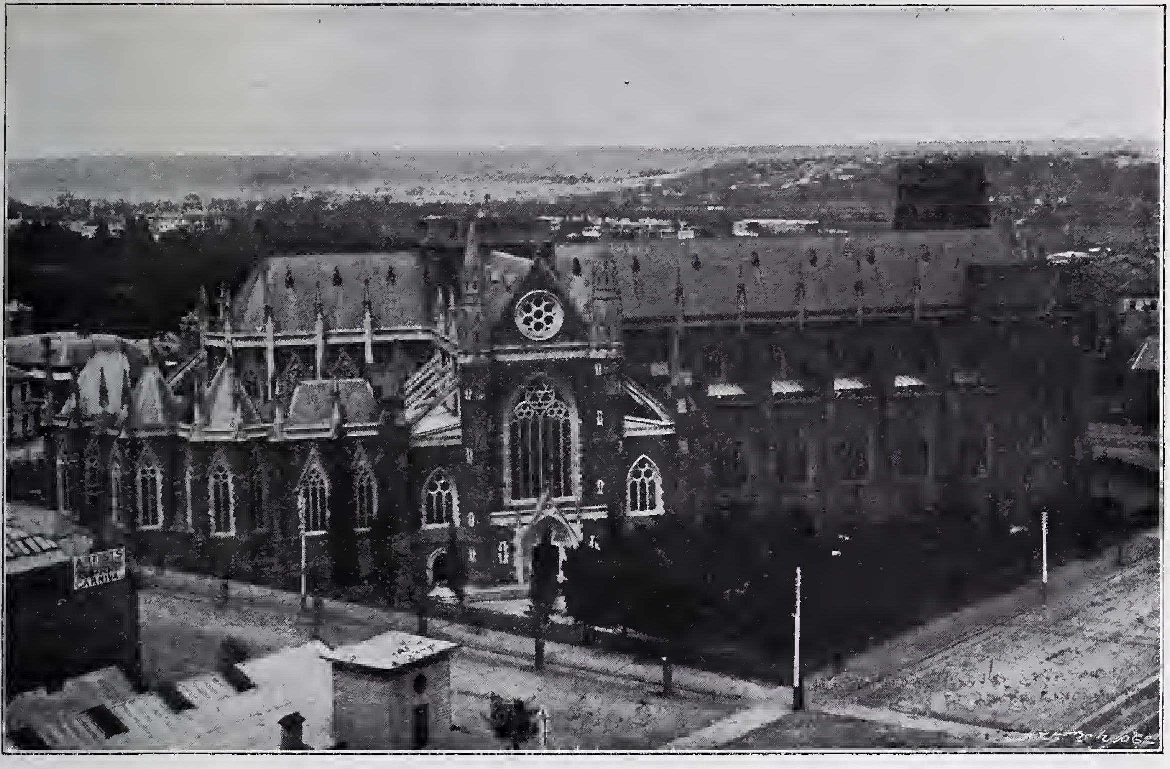

FIG. 7.—ST. PATRICK'S, THE ROMAN CATHOLIC CATHEDRAL AT MELBOURNE.

The English, Scottish, and Australian Bank is situated opposite the Bank of Australasia, at the north-east corner of the streets last mentioned. It is the only bank in the city in which the Gothic style has been adopted. The façades are entirely of freestone, imported from New

South Wales, and the whole rests upon a base of blue-stone. When the design for this Bank was prepared, the Melbourne manager was Sir George Verdon—a very great patron of the fine arts, and especially well read in architecture. His predilections were always in favour of the Gothic style; so that in all the country and suburban branches of this Bank in Victoria this style has been adopted. Sir George Verdon was at one time President of the Royal Victorian Institute of Architects. The original allotment upon which this Bank stands was

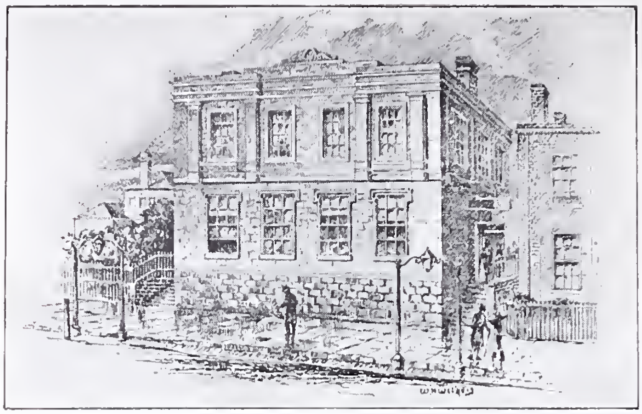

FIG. 8.—THE ORIGINAL BUILDING OF THE BANK OF AUSTRALASIA.

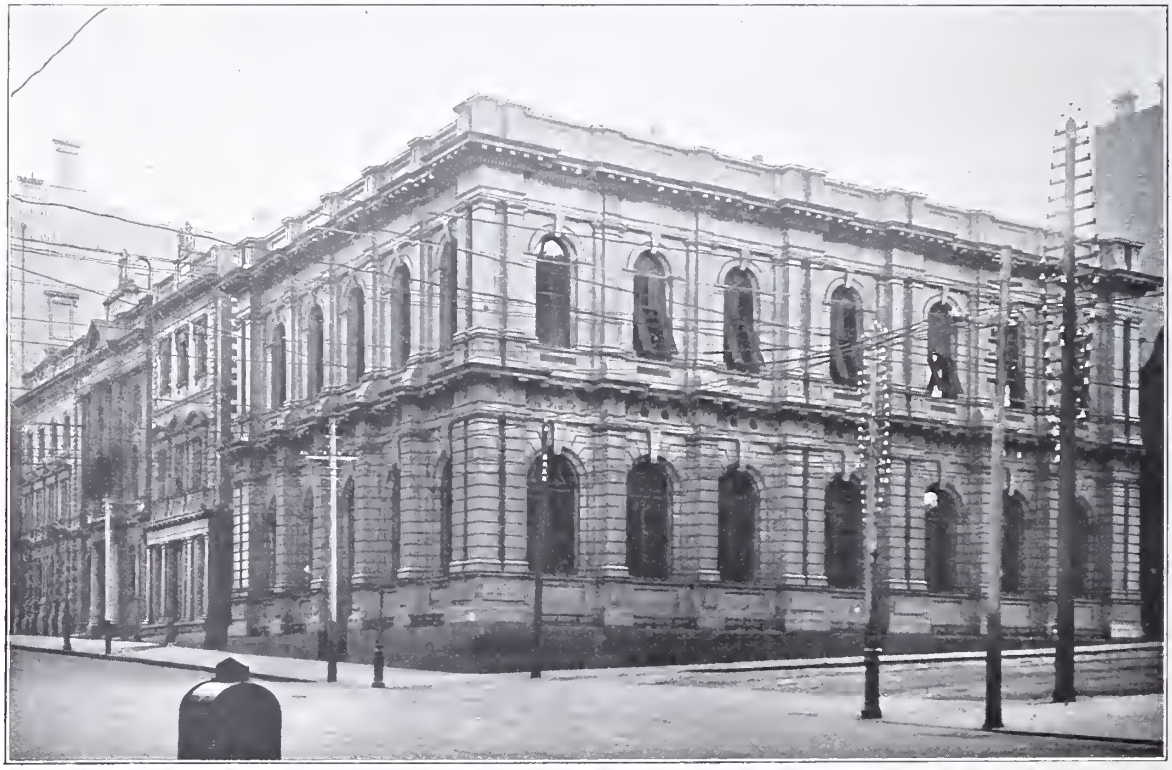

FIG. 9.—THE PRESENT BUILDING OF THE BANK OF AUSTRALASIA.

first purchased for £61, but the present owners paid no less than £60,000 for the site in the year 1888. The Bank of Victoria was erected in 1866. It can hardly claim originality of design, being a rather close copy of a well-known building on the Grand Canal, Venice. The façade is of Tasmanian freestone with a blue-stone base.

The National Bank of Australasia was erected in 1868. The design is Palladian, and it has been carried out in freestone, with a bold stylobate of blue-stone. The banking chamber is surmounted by a dome, springing from eight detached Corinthian columns. At the date of its erection, iron-workers in Melbourne were so few in number, and so inexperienced, that the whole of the framing and iron construction of the dome were made in London, from the designs furnished by the Melbourne architect, and shipped out here. Since then many practical engineers have established factories in Victoria, so that all kinds of wrought iron and steel works, even to the construction of locomotive engines for our railways, are now made in the Colony.

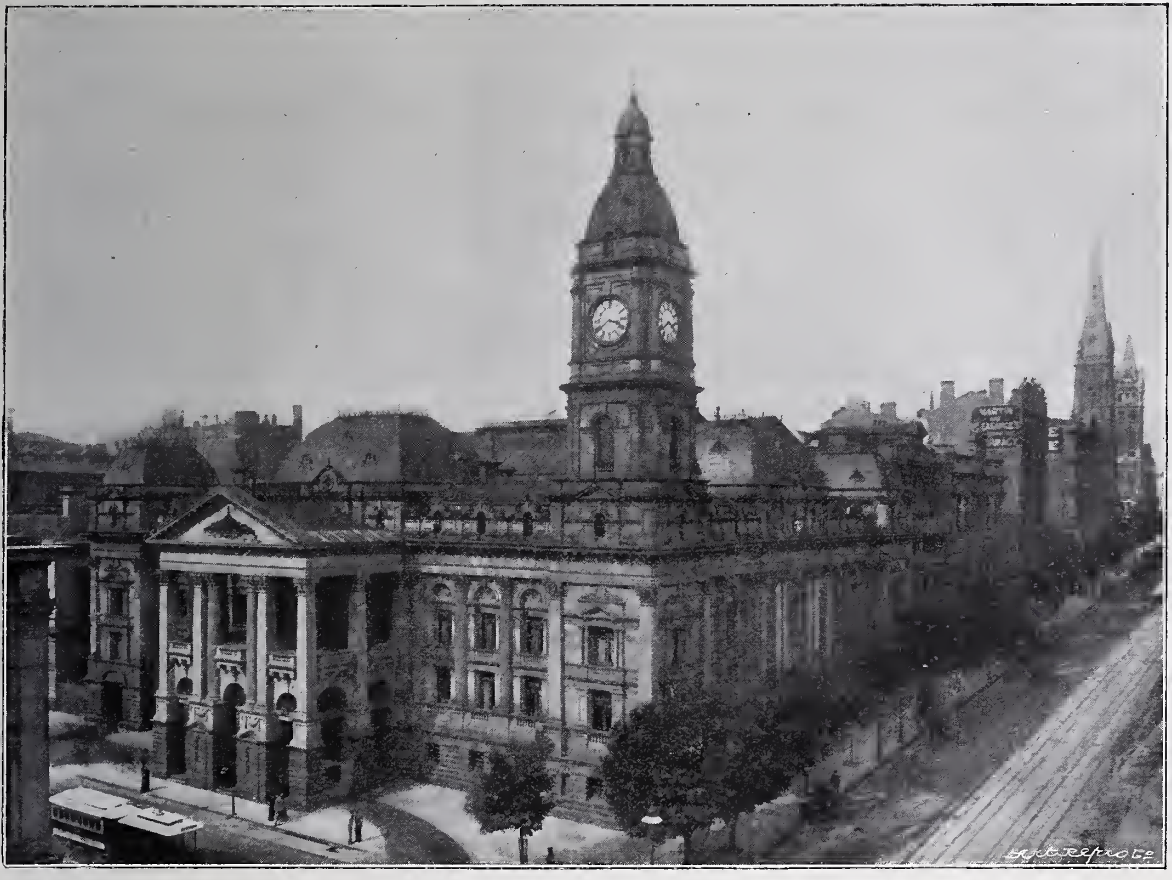

FIG. 10.—THE TOWN HALL, MELBOURNE.

The Union Bank was designed by a London architect. The lower story is executed in grey Victorian granite, and above that in freestone.

The Commercial Bank was erected in 1892, and has the façade constructed in granite from the ground line to the top of the mezzanine, and above that in New South Wales freestone, relieved with columns and panels of polished granite from Aberdeen.

Since the year 1851 nearly all the then existing buildings in Melbourne have been replaced by others, and many of the latter are now being steadily demolished, in order to provide structures of a superior kind; so that within a period covered by less than fifty years the greater part of Melbourne city will have been twice rebuilt.

About the year 1890, when the value of land in and near Melbourne had risen to a fictitious value, a mania for the erection of lofty structures, of seven stories and upwards, set in: so that here and there we have samples of "sky-scrapers" which stand out only too obtrusively, and seriously dwarf the buildings adjoining them; instead of adding to the beauty of our city, they really disfigure it.

The Equitable Life Assurance Society of the United States of America has erected a very large and imposing building at the north-west corner of Collins and Elizabeth Streets. It is constructed on the American principle—the external walls simply forming a casing or skin to the whole structure, which is of steel framing, and standards which carry the weight of all the floors and roofing. The façades are built entirely of grey Victorian granite, except the lowest course of the plinth, for which polished red granite has been used. It is the only example in Victoria of this kind of construction. The internal fittings are very elaborate. The main staircase and landings are of marble, and the walls around them are faced with polished marble in panels.

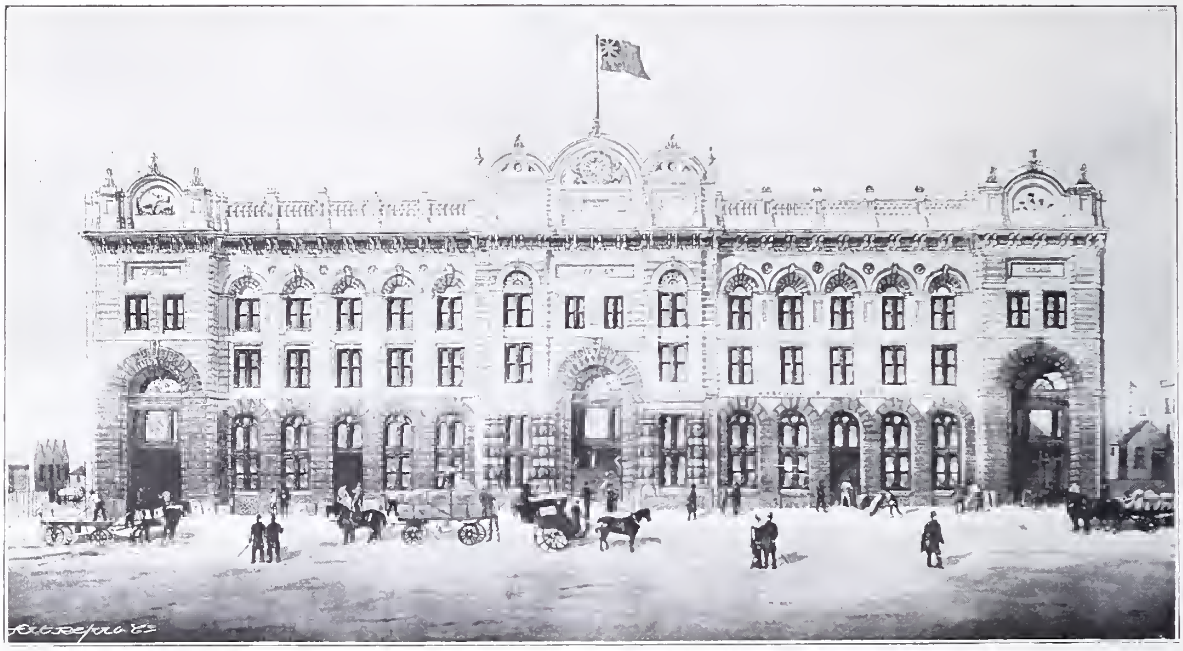

FIG. 11.—WAREHOUSES AND OFFICES OF THE NEW ZEALAND LOAN AND MERCANTILE AGENCY COMPANY, MELBOURNE.

I may here say, with some feeling of satisfaction, that experience seems already to have taught the owners of land in the city that buildings of about five stories in height may give an adequate rental return, but that, at present, additional stories will not pay interest on the increased expenditure they involve.

The original Melbourne Town Hall was erected in 1850. The façades were of a very poor Victorian granite, which abounded in mica, so that many parts of the building gave evidence of rapid decay. It was removed in 1868, and replaced by the present building [fig. 10].

A sketch of our present architecture would be incomplete without some reference to the business premises of our Wool and Grain Corporations. The most important are Dalgety & Co.'s Offices, and those of the New Zealand Loan and Mercantile Agency Company [fig. 11]. Both of these buildings have the lower portions constructed of bluestone, with the upper parts, the one of brick with freestone dressings, the other wholly of imported freestone; and both I consider characteristic in style, and of importance commensurate with the large interests involved in these corporate bodies.

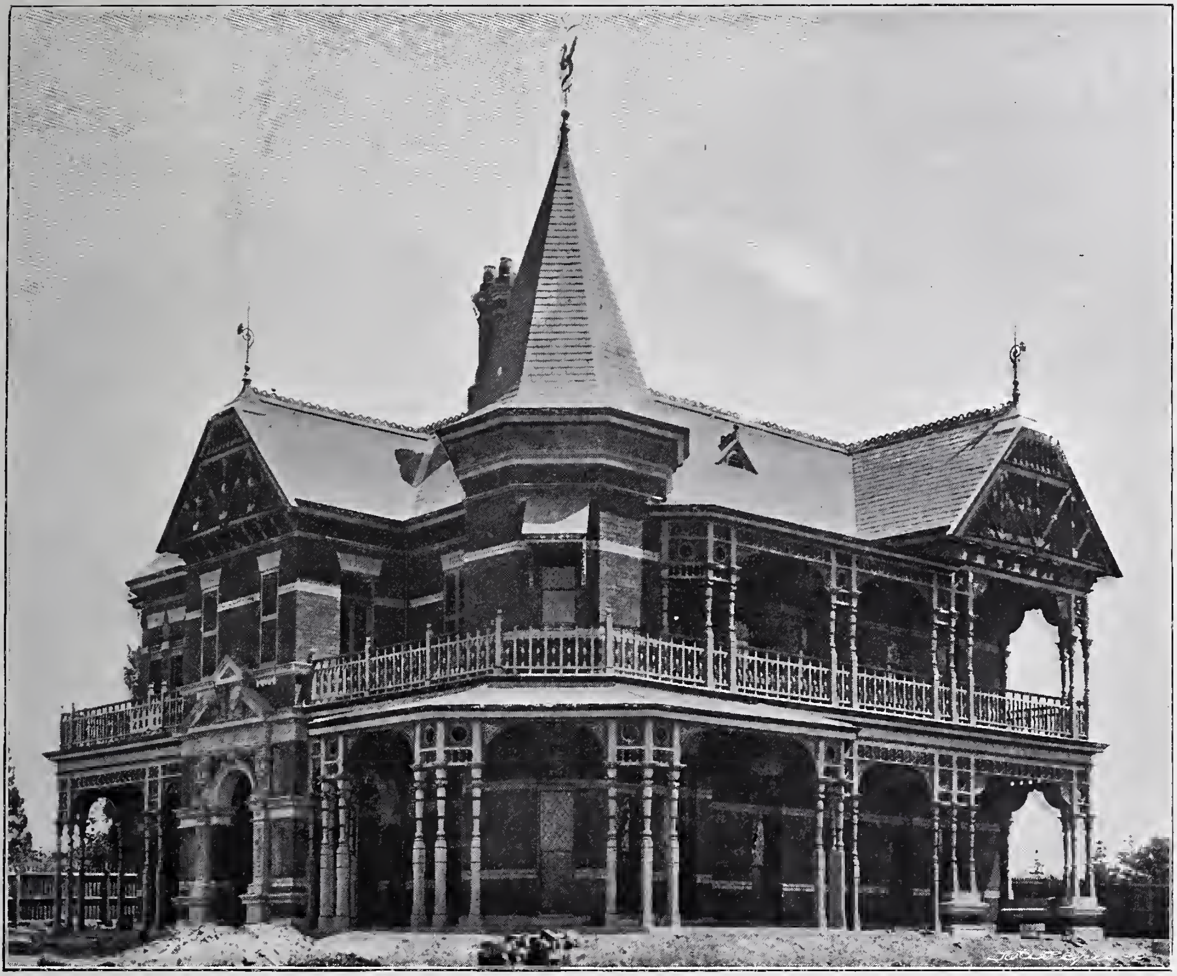

FIG. 12.—A TYPE OF DOMESTIC ARCHITECTURE IN VICTORIA.

Improvement in our domestic architecture has lately made rapid strides. The increasing use of roofing tiles in lieu of slates, and of stone and brick not covered with cement or stucco, as well as a studied endeavour to make the appearance of our dwellings more picturesque, have largely contributed to the advancement of this branch of architecture. This Colony, like most new countries, has a tendency to run to extremes, and I fear there is some danger of the picturesque being pushed so far as almost to become the grotesque. The straining after effect in unduly broken roofing, and in the introduction of features which are striking only because they are quaint and uncommon, and which have no sufficient *raison d'être*, will, if this latest fashion be unduly encouraged, mar what would otherwise be an undoubted improvement in this branch of architecture. I would observe also in this connection—and herein lies not a little danger—that there appears to be a growing feeling or conviction amongst those who indulge in the erection of private dwellings, that novelty, however produced, indicates progress and true artistic expression; and that almost anything that is clearly a departure from hitherto recognised treatment, either constructively or in design, is necessarily clever and to be encouraged. The accompanying illustration [fig. 12] will give some idea of the prevailing domestic style.

In closing this brief sketch, I would remark that the go-ahead or progressive character of the British race is a marked feature of Victoria; especially among those engaged in constructive and manufacturing pursuits. Immediately upon the introduction from any part of the world of anything new, either in material or in constructive methods or appliances, the ingenuity of our colonists is directed to its production by similar or kindred methods. As a consequence, we are now able to produce locally as good tiles for pavements as those of Minton, and also as good roofing tiles as those from Broseley. Similarly we now manufacture excellent fibrous plasterwork, as well as stamped or embossed zinc for ceilings and other decorative purposes. We have also excellent artificers in ornamental wrought-iron and metal work, and are very little behind the best manufacturers in Europe in the production of nearly all that is required for the erection, completion, and decoration of every class of building. We do not, however, as yet manufacture paper-hangings. One important thing we lack, but are tending gradually and perceptibly to encourage and develop—viz., the artistic power to produce thoroughly original designs in all departments of the building trade; and we live in the confident hope and expectation of being, before another generation passes away, self-producing in all the branches of trade necessary for the efficient execution of any designs that may emanate from members of our profession.

P.S.—It may be interesting to add, as evidence of the rapid growth of the city of Melbourne, that during the last sixty years its population has increased from 5,000 to over 450,000; and also to state that the advantage to the citizens of developing the quarries and extending the use of the Stawell freestone I have above referred to, is so widely entertained, that within the last twenty-four hours an influential deputation waited on the Chief Secretary and urged that this stone should be used in building the additions to the Public Library, instead of the Tasmanian stone originally proposed.

Melbourne: 14 June 1899.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS 1834

INCORP. 1837 1887

9, Conduit Street, London, W., *26th August* 1899.

CHRONICLE.

The Paris Exhibition Buildings.

The first Paper of the Session, to be read on the 20th November, will be on the Buildings of the Paris Exhibition 1900, by M. Ch. Lucas. There are few Hon. Corr. Members whose relations with the Institute have been so close and cordial as those maintained by M. Lucas, and he is certain to receive a hearty welcome.

The late William Simpson [*H.A.*], R.I.

By the death of Mr. William Simpson [*H.A.*] the Institute loses one of its most distinguished members. Mr. Simpson joined the Institute as an Honorary Associate in 1880, but his name had been long previously known to members by the many valuable Papers he had contributed to their Proceedings on the subject of Indian Architecture and Archæology, the first dating as far back as 1861. One of his most interesting Papers was the one on "Mud Architecture," read in the Session 1886-87. Whatever he wrote on these subjects was with the profound knowledge of an expert antiquary and the æsthetic appreciation of an artist. The late James Fergusson has placed on record his testimony as to the value of Mr. Simpson's work in this direction: "He has a most wonderfully correct eye for details and a marvellously facile pen in delineating them, and his restorations are done with a judgment and knowledge of which we have hitherto had no experience."

William Simpson was born in Glasgow in 1823. Originally he studied architecture for a profession, but afterwards took up lithography, as a practitioner of which he came to London in 1851. It is as an archæologist, however, that Mr. Simpson is specially known to the Institute, and it seems to have been his desire to be chiefly known as one to the world at large; but the great work of his life that has made his name familiar to the general public has been his war-correspondence to the *Illustrated London News*. Few men have had a more adventurous career. At the age of thirty he was sent out by the firm of Colnaghi to the Crimea to make sketches of the campaign. He went through all its miseries before Sevastopol, and was present at its fall. In 1866 he joined the staff of the *Illustrated London News*. He was with Lord Napier at the capture of Magdala, and with the French all through the Franco-Prussian War, suffering the privations of the besieged in Paris during the Commune. To what part of the world he did not go to carry out his profession as artist-journalist it were difficult to say. With the East he was as familiar as with the West. In 1872 he was in Pekin sketching the Emperor's wedding festivities. Then he accompanied the Prince of Wales through India. In 1878 we find him marching with Sir Samuel Browne through the Khyber Pass, and in 1884 he was with the Central Asian Expedition under Sir Peter Lumsden.

Besides the many Papers printed in the Institute TRANSACTIONS he has published a volume *Meeting the Sun*, a stirring account of his travels, and *The Buddhist Praying-Wheel*, in which his theories on Oriental symbolism are developed. To conclude with a matter of small relative importance, his loss to the JOURNAL as a generous, ever-ready contributor on Oriental subjects can never be repaired.

The following is a list of Papers read by Mr. Simpson before the Institute and printed in the TRANSACTIONS:—

"On the Architecture of India," TRANSACTIONS 1861–63, p. 165.

"Abyssinian Church Architecture," TRANSACTIONS 1868–69, p. 234.

"The Architecture of China," TRANSACTIONS 1873–74, p. 33.

"Buddhist Architecture in the Jellalabad Valley," TRANSACTIONS 1879–80, p. 37.

"Architecture in the Himalayas," TRANSACTIONS 1882–83, p. 65.

"Mud Architecture in Persia and other Countries," TRANSACTIONS 1886–87, p. 57.

"Origin and Mutation in Indian and Eastern Architecture," TRANSACTIONS 1890–91, p. 225.

"The Classical Influence in the Architecture of the Indus Region and Afghanistan," JOURNAL, 3rd series, Vol. I. (1893) p. 93.

Cav. Boni's Researches at the Roman Forum.

Mr. JOHN HEBB [*F.*] writes—

Cav. Giacomo Boni [*Hon. Corr. M.*], the superintendent of the work of exploration of the Forum of Rome under the Minister of Public Education, has recently discovered near the *niger lapis*, or so-called tomb of Romulus, and the arch of Septimius Severus, portion of a cippus, or monumental pyramid, with an inscription which Cav. Boni considers to be the most ancient inscribed monument in the city of Rome, and that it dates from the sixth century B.C.

The cippus, which is of tufa, in the form of a frustrum of a pyramid, is quadrangular on plan with the external angles splayed off. It is broken, and is from 1′ 6″ (0·470 m.) to 1′ 8″ (0·518 m.) wide, and from 1′ 5″ (0·455 m.) to 2′ 0″ (0·610 m.) high, exclusive of the smooth portion let into the ground, where it is from 1′ 5″ (0·450 m.) to 1′ 7″ (0·488 m.) wide.

On the four sides and on one of the splayed angles of the cippus is an inscription, in large letters of archaic Greek form, resembling the most ancient Etruscan inscriptions of maritime Etruria, which has been transliterated by Professor Gamurrini and interpreted by Professor Luigi Ceci as follows:—

Qui fordas consecret, consecrato sacellum versus (*vel* ad sacellum).

Sordas (*sc.* qui sordas consecret, consecrato) seorsum a sacello.

Idiariis (= Idibus) regi liba adferat ad rem divinam (= ad sacrificium).

Quos rex per augurem calatorem induhapeat (consecratum admittat) adagio (= carmine) (*vel* in sacro loco), (*is*) precibus auspicia capiat, dona votiva voveat.

Itemque rei (*sc.* rei divinae) curet nonariis (= Nonis) ibi.

Qui auspicio nequam sit dolo malo, Iovi esto.

Qui voto (*sc.* qui voto nequam sit dolo malo), sacer Iovi esto.

The cippus and two pedestals in the neighbourhood were wilfully destroyed, their destruction having been expiated by a sacrifice of which there are evidences in the soil upon which they stand. This soil, to a depth of about fifteen inches, consists of cinders, charcoal, and *humus*, lying upon the gravelly sediment from Ponte Molle.

The *New York Nation*, commenting upon the results so far of Cav. Boni's labours at the Roman Forum, says:

Literally, from one end to the other of the space dug over by previous excavators, things not only new but of permanent value to scholars have been brought to light. Inscriptions, vases, fragments of sculpture and architecture have all given a quota to the total result. In front of the temple of Antoninus and Faustina the earth has been cleared away to a depth of four feet, and the brick core of four more steps of the temple is now visible. This core is of two parts, each originally supporting two marble steps. Directly opposite and on the other side of the Via Sacra, the clearing process has revealed to us three steps, nine inches in height but of unequal width, that descended from the Regia to the road. Signor Boni has long desired to determine the upper reach of the Sacred Way, and, assisted by the discovery of these steps and by that of a sewer below the road where it runs between the Temple and Regia, his efforts have terminated in success. The sewer is a large arched passage stretching its long-drawn curves, of well-built *opus reticulatum*, from the north-east westwards. Along the pebbly bed flows a small brook. It is evidently one of the original watercourses of the Forum walled in and turned to serve the uses of man. The view along the mossy walls, flecked here and there with sunlight shot through the openings in the road above, with the little brook flowing just where it flowed two thousand years ago, is really very pretty. It was natural to suppose that this sewer followed the original lines of the road, and on this hypothesis Signor Boni set to work digging on the south side of the Basilica of Constantine, and there, some six feet below the surface, found a fine pavement of carefully jointed polygonal blocks similar to the bit by the temple of Saturn. This is unquestionably the ancient pavement of the Sacred Way. It will not be hard to continue this line of exploration and ascertain the course of the Way toward the east.

In this region another monument that has assumed a very different aspect from of old is the Arch of Fabius. The well-known pieces, discovered several years ago, lay heaped carelessly together. They have been joined with others lately found, and now, with only one or two *voussoirs* missing, the arch lies in orderly and intelligible fashion on the ground. Neither the side piers nor the basement have been found, so that re-erection is out of the question, but the spread of the arch can be measured with an accuracy sufficient for all practical purposes. It turns out to be larger than was imagined by those who up to this time have written on the subject. Though the exact spot where the arch stood has not been determined, its position was probably close to the roughly built brick chamber nearly opposite the Temple of Romulus. One reason for thinking this to be the spot is that most of the remaining portions of the arch were found here. Another reason is, that the eastern wall of the brick chamber just mentioned is constructed in part of the remains of the wall of an earlier structure, in which are still visible two narrow openings, like loopholes, which suggest that this was originally a guard-house. It is possible that these seeming loopholes are only windows, but it seems unlikely that in this part of the Forum there could have been any building other than one of distinctly public use.

The Sanitary Inspectors' Examination Board.

The first Examination for Certificates of qualification for appointment of Sanitary Inspectors, under Section 108 (2) (a) of the Public Health (London) Act 1891, will be held in London on Tuesday, 5th December 1899, and the four following days. Particulars will be forwarded on application to the Hon. Secretary, Mr. William R. E. Coles, 1 Adelaide Buildings, London Bridge, E.C.

Royal Isle of Wight Infirmary.

The *Court Circular* of the 31st ult. states that Her Majesty the Queen drove to Ryde and opened the new children's wing of the above on 28th July. After the reception and a short service, the architects handed an electric case to Princess Henry of Battenberg, which was passed to the Queen, when Her Majesty opened the doors of the new building by completing the electric circuit, and declared the wing open. Among others, the architects, Messrs. Keith D. Young [*F.*] and Henry Hall [*F.*], and Mr. E. Onslow Ford, R.A., who had executed a bust of Her Majesty previously unveiled at the hospital by the Princess, were presented to the Queen by the Princess.

REVIEWS.

ART IN FRANCE.

A History of French Art, 1100–1899. *By Rose G. Kingsley, Officier de l'Instruction publique.* 8o. *Lond.* 1899. *Price* 12*s.* 6*d. net.* [*Messrs. Longmans, Green & Co.,* 39 *Paternoster Row.*]

To compress a deliberate history of French art from the year 1100 to the present day into a volume of 500 pages is a manifest impossibility, and Miss Kingsley's book is not so much what she styles it as a dictionary, biographical and critical, of the leading artists of France, with a sufficiency of introductory and explanatory matter. But, if we demur to the sounding title, the work is still really valuable, both as a book of reference and because it gives in very readable language a continuous and intelligible sketch of the influences and conditions which have moulded French art, the qualities on which it has thrived, the personalities and characteristics of those leaders who, like David, left their individual impress on the whole art of their day.

Such a book was badly wanted. At the same time, Miss Kingsley accuses us of a degree of insularity to which we decline to plead guilty when she says that no people in Europe knows so little of French art as we do. The literature which is daily growing round the beginnings of Gothic architecture in France is indeed in the hands of French and Germans; but the primrose paths of loving appreciation have long been trodden by English feet. At least we may claim an intelligent familiarity with French architecture—more than that possessed by the average Roumanian probably—and, in a less degree, with the schools of sculpture. But the truth is that Miss Kingsley, when she made her indictment, was full of the ignorance of Chardin, of Rousseau Diaz, and Harpignies, of Barye and Rude, of Carpeaux and Frémiet, which till quite lately was true of an immense majority of our fellow-countrymen, and was not thinking of architecture at all. Her own interests are apparently elsewhere. The earlier stages in architectural development are passed over in a somewhat summary and unsympathetic fashion, her authorities being Viollet-le-Duc and Gouse, and it is not till she reaches Pierre Lescot and Bullant that she warms to her theme.

The story of French art is a stimulating one. It shows us native genius rising superior to every adverse circumstance, springing with new vigour from the ashes of foreign influence, or bursting triumphantly through the barriers with which academic taste or royal prejudice had fenced it round.

The State in France, whether the initiative lay with king, emperor, national assembly or republican chamber, has always kept for itself the authority of high pontiff in matters of art, with results which one cannot in candour call wholly bad.

When the era "of the love of things of the intellect and the imagination for their own sake," which we call the Renaissance, dawned, the kingship had also at last grown to be an actuality, and king and court were paramount in the domain of fine arts no less than in that of politics. Under their auspices "the great Leonardo da Vinci," says Miss Kingsley, "was getting his 700 crowns at Tours, Primaticcio and Rosso were painting at Fontainebleau, Benvenuto Cellini was designing the great fountain which makes the king exclaim in a strong voice, 'Verily I have found a man here after my own heart.'"

Yet, with every incentive to copyism, it would be wrong to say that French art was ever untrue to itself or absorbed anything that was alien to its own genius. Strength of instinct or of conviction in the native artist made the invader powerless for ill, and in some instances so worked upon him that he was found sitting at the feet of those he came to teach.

Passing on to the time of Louis XIV., we find the "spirit of art in this remarkable epoch expressed in two phenomena—the founding of the Academy of Painting and Sculpture and the Palace of Versailles." The founding of the Academy was primarily the work of the painters themselves, a practical counterblast to the Corporation of Master Painters and Sculptors, which was throttling the free exercise of art, or bid fair to do so. But the painters were innocently putting an edged tool into the hands of the king. The Maitrise had chastised them with whips; Louis was to chastise them with scorpions. From this time forward art was under the direct control of Government, and the phantom of liberty had vanished before a tyranny which was to last till it was swallowed up in the great whirlpool of the Revolution. What the Revolution did for art and education, how vast and enlightened the projects which it could never fully realise, is an old story; but a despot arose in the most convinced of revolutionaries among the ranks of painters, Louis David, who, by force of character and fervour of belief, forced his reading of art on the whole group of his contemporaries, and treated as renegade and traitor any one who wandered from the strict path of Græco-Roman tradition. In our own time and in the time of our fathers, the same blind intolerance has been at work. Corot, Rousseau, Daubigny, Troyon, had to battle against the whole weight of the "Institut" and the "École des Beaux Arts." For thirty years Corot never sold a picture; Rousseau's whole life was embittered by injustice; later, Manet was absolutely excluded from the Salon for years, and the official world was beside itself when the Emperor and Empress visited a collection of his works.

The same old tale of savage repression by the bumbledom of the artistic world has repeated itself again and again, always to be thwarted by the irrepressible vigour of unofficial inspiration. Miss Kingsley is no mere cold-blooded recorder of events; her sympathies go out to the pioneers, the prophets, the martyrs of each generation. If the book runs to a second edition, as it must, she will doubtless be found ranged frankly on the side of Rodin, the man of "Balzac in his night-shirt;" so far she keeps an open mind on the subject.

But if the influence of the constituted authorities in the spheres of painting and sculpture is, on the whole, unacceptable to her, the State administration of architecture finds more favour in her eyes. She quotes with sympathy and approbation a description of the educational functions of the State by the late Secretary of the Institute, W. H. White, a man well qualified to speak on the point, which expounds with such admirable clearness the virtues of State control, and the advantages to be derived from it, as almost to bring conviction to the unbeliever.

Here we must leave Miss Kingsley with cordial aspirations for the speedy issue of a new edition, and, when the time comes, may one hope that some of the many printer's errors may be corrected? "Ruben's continuator," "Corregio," "Rembrant," "Palingenisis," "Bernadin de St. Pierre," "Georges Sand," "pleine air," "le plage," "personel," "Ribiera:" these are only a small selection, and some of the translations from the French are too literal to be agreeable. "Which reposes us" and "It impassioned a century" are Gallicisms far from adequately disguised.

A. E. Street.

THE CONDUCT OF BUILDING WORK.

The Conduct of Building Work and the Duties of a Clerk of Works. By John Leaning, F.S.I. 4o. London, 1898. Price 2s. net. [B. T. Batsford, 94 High Holborn, E.C.]

This is a considerably amplified version of Mr. Leaning's *Duties of a Clerk of Works*, and its general plan differs but slightly from that of the original book. The hints it gives are classified, as before, under the various trades in the order of a specification, and sub-headings have been inserted in distinctive type to facilitate reference. The work in its present form has gone rather beyond the scope of the previous edition. It now contains more than hints to clerks of works, but it hardly goes far enough to be of much greater use to architects than it was before. In fact, the notes referring to the duties of the architect are a somewhat doubtful improvement to the book. They would be better either omitted or more fully worked out. It is unfortunate that several manufacturing firms have been mentioned by name. An appendix gives examination papers and other information relative to the post of clerk of works in H.M. Office of Works, and a very good index concludes the volume.

Matt. Garbutt.

LEGAL.

Architect's Charges: Abandoned Scheme.

WILLS *v.* CHAIRMAN AND GOVERNORS OF THE SWANSEA TECHNICAL AND INTERMEDIATE SCHOOL.

At the Glamorganshire Assizes, at Swansea, on the 7th August, Mr. Justice Kennedy and a special jury had before them an action in which Mr. H. W. Wills, architect, claimed from the defendants certain fees for professional services in connection with proposed new buildings for the Swansea Technical and Intermediate School. According to the evidence, as reported in the *South Wales Daily Post* of the 8th August, the plaintiff was employed to prepare plans, &c., for the proposed new schools, his remuneration to be at the rate of 4 per cent. on the sum expended, and 1 per cent. for taking out quantities. The plans, as prepared in accordance with the instructions, were approved and adopted by the defendants. The estimated cost of the buildings amounted to £15,500, and the lowest tender was £15,546. The Charity Commissioners, to whom the scheme was submitted, refused their consent to it, on the ground that there must be two buildings, one for technical and one for intermediate education. Mr. Wills was then requested to make new plans and invite fresh tenders for two new buildings. This was done, and tenders were obtained—£4,739 for the intermediate building, and £8,162 for the technical, making a total of £12,900. The new schemes were submitted to, and passed by, the Charity Commissioners and the Local Government Board. The defendants then became aware that certain clauses in their leases made it impossible for them to carry out the proposed buildings, and the schemes had consequently to be abandoned. There was a question as to the amount of the remuneration originally agreed upon, the plaintiff claiming £692 4*s.* 4*d.* in the event of his fees being found to have been fixed at 5 per cent. commission and $1\frac{1}{2}$ on the bills of quantities; or £551 12*s.* 1*d.* should it appear that the agreement was 4 per cent. and 1 per cent. respectively. The sum of £250 had been paid by the defendants before the action was brought, and the balance now sued for was £442 2*s.* 4*d.*, or £301 12*s.* 1*d.*, according to the finding as to the exact agreement between the parties. The Judge intimated during the hearing that on the evidence the claim must be limited to the lesser sum.

Mr. Edwin Seward, giving evidence as to the charges usual in the profession, stated that the charges for several of the items were rather below than above the regular charges. He had examined the drawings, &c., prepared by the plaintiff, and found that the work had been very ably done. Regarding the question of quantities, another architect witness stated that the labour involved was practically equal to taking out quantities twice over.

For the defence it was contended that the claim was excessive. In the first place Mr. Wills had been told that the cost must be limited to £8,000; his plans, however, would have involved an expenditure of over £15,000.[*] The claim for the second new scheme was unreasonable; it was really one scheme, which had to be modified. Under the circumstances, as the building scheme had had to be abandoned, the £250 already paid was ample remuneration.

His Lordship said he could not see what possible reason there was for defendants declining to pay, at any rate for the first set of plans. How could they blame the architect for producing an expensive scheme when they themselves approved of it and sent it to the Charity Commissioners? With regard to the second set, possibly they might consider that the alterations were not so great as to justify the whole claim. It was for the jury to consider whether they would award less than was claimed or anything at all for those plans.

The jury, without leaving the box, found for the plaintiff in the amount claimed, viz., £551 12*s.* 1*d.*, less the £250 already paid on account. Judgment was accordingly entered for that sum, with costs.

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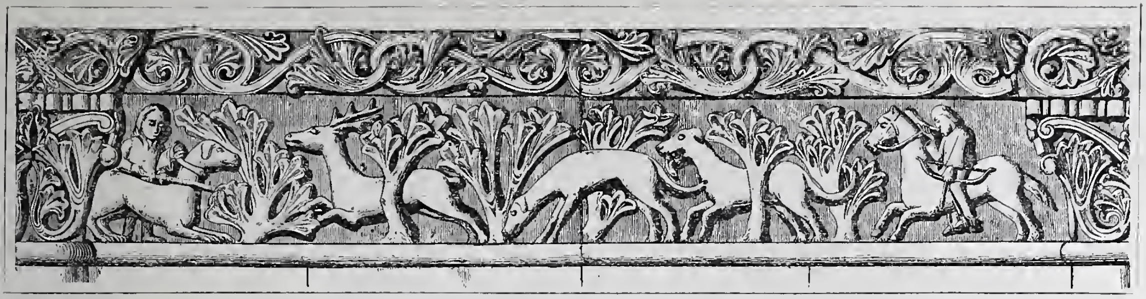
[*] Concerning this point, Mr. Wills writes: "Some very cardinal points are omitted from the published reports of the case, such as my explanation how the original estimate, £10,500, was increased to the actual tender, £15,546. I explained that when levels were taken and trial holes sunk, the cubic contents of the building were increased so materially that I had to report to the Governing Body that the cost would be at least £13,500."



THE CRADLE OF ARCHITECTURE.*

THE infant architect, like other infants, has to take his food in nursery doses. Meat is not for babes, and the strong meat of architectural history has to be cut up into small and peptonised fragments before it can be digested in the brain of a student. Good teachers, to be sure, are ready to insist that the boundaries of the styles are no hard and fast lines; and good learners sometimes realise that the too clear definition which illuminates a text-book is but a schoolroom substitute for the hazy twilight of facts; but with most men there lingers on a simple faith in the literal truth of the laws of the handbooks, until some contact with the realities of architecture awakens in them a sense of the insufficiency of the accepted classifications which is only equalled by the marvel of their being so nearly true. The awakened architect finds out that the dates and styles which he has learnt to correlate are not invariably correlative; he observes too that at the points of juncture between the recognised styles there are tracts of fluid uncertainty, and then, after a wave of distrust in the whole science of comparative architecture, falls astonished before the fact that it should have been possible to effect a classification at all. Looking at the matter fairly and squarely there is, perhaps, nothing in the whole history of man more marvellous than the community of architecture. That there should be in our great art a unity of purpose and a unity of method, which overrides the differences alike of climate and of race, is more striking than most of the facts in human civilisation. That in days of slow travelling and difficult communication buildings of conspicuous similarity should have been erected in lands widely distant, and that the sequence of changes in styles should have followed nearly identical lines of development in remote districts, is, to say the least of it, a human phenomenon which, from an anthropological if from no other point of view, claims attentive admiration. Hitherto our study of developments has rather obscured the study of origins. We have examined, compared, and analysed the waters of the rivulets without always giving due homage to the fountain heads, sometimes without stopping to inquire where the fountain heads might be, sometimes accepting without much inquiry any plausible suggestions of source.

"Leader Scott," a lady whose writings and ability have been better recognised in Florence than in England, has come before English readers with a book of altogether unusual architectural significance. It may be that the bold thesis which forms the backbone of her volume is, to some extent, a mere transcript in intelligible form of the not too intelligible work on the same subject by Professor Giuseppe Merzario; † it may be that the theory is carried too far and unduly pressed, it may be that some of the evidences are strained; it is certain that the true significance of various architectural facts is misunderstood, and that the volume is discursively weighted with matter that had better have been left out; but for all that the work is wide, bold, intelligent, and original, and in these respects deserves and earns a credit to which few architectural writers of recent years can lay claim. Recent architectural literature, with a few notable exceptions, has been so greatly occupied with special periods and special styles that we have been losing sight of the possible influences that might give coherence to disjected phases. Leader Scott takes a bold plunge with a sweeping theory. It is nothing less than the attempt to refer to a common medium—a common and persistent individual agency—the whole period of what we may call Christian architecture in Europe from the twelfth to the fifteenth century. "How did all these great and noble buildings (the cathedrals) spring up simultaneously in all countries and all climates ?" and "How comes it that in all cases they were similar to each other at similar times ?" These are the two great questions which Leader Scott asks and attempts to answer. A captious critic would at once reply, in regard to the second inquiry, that it assumes a perfection of identity which is not borne out by facts ; but the question lies near enough to truth to be worth an attempted reply, and we have no need to begin cavilling at the outset.

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* A review of *The Cathedral Builders: the Story of a Great Masonic Guild.* By Leader Scott. 8o. Lond. 1899. Price 21*s*. Sampson Low, Marston, & Co., St. Dunstan's House, Fetter Lane, E.C. † *Maestri Comacini*, Milan, 1893.

The writer gives as her answer that this all-pervading and all-generating influence is the Guild of the Comacine Masons. She assumes, and has some right in assuming, that all the good work done in Italy between 500 and 1200 was due to their immediate operations or their indirect influence ; and it is her object to prove that the bulk of the work done in the succeeding three hundred years was also the work of their hands or of the lodges which were founded in the Italian cities as offshoots of the parent organisation.

Our earliest documentary token of the corporate activity of the Guild is to be found in an edict of King Rotharis, dated 643, and brought to light by the archæologist Muratori, which contains two clauses relating to the conditions for compensation and liability for accidents on buildings under the charge of the Magistri Comacini. These are sufficient to prove their existence as a recognised body in the seventh century. Their origin has been ascribed by various theorists to Rome, Byzantium, and the East. The Germans, I believe, have been the chief supporters of the theory of Byzantine origin, while that which points to an Oriental source depends upon the internal evidence in the works of the Guild of supposed Eastern symbolism in certain forms of decoration. On the whole, the view that the Comacine masters are the descendants of the Roman *collegia* is the best attested and the most inherently probable. It is backed by the prevalence of what we may call Comacine work in many of the so called Lombard and pre-Lombard churches of Rome, in one of which, the Sub-Church of San Clemente, a fresco of the eighth century represents what Leader Scott claims to be a Magister in the act of directing his subordinates. The fresco itself is no doubt clearer than the photograph which is reproduced in the volume before me ; otherwise one is inclined to doubt the conclusiveness of the reasoning which sees in this representation an illustration of *collegiate* building operation. In fact the fresco by itself would seem to prove no more than that the work of building labourers was in the eighth century sometimes superintended by a man in a *toga*, who may or may not have got on a masonic apron as well. But happily the assumptions of the writer are based on other and stronger evidences, and there is every ground for accepting her conclusion that some time after the destruction of Rome by the barbarians the survivors of one or more of the Roman *collegia* betook themselves to Como or its neighbourhood, and were in time employed by the Longobards to produce what we generally, and no doubt improperly, call "Lombard Architecture."

Thomas Hope, in his Essay on Architecture, which Leader Scott knows and quotes in an Italian version, surmised the existence of the Comacine Guild, though he had little documentary proof of its existence, and even hinted at a connection with the Roman *collegia*.

Cesare Cantu, in his *Storia di Como*, perhaps in jealousy for the special honour of Como, looks upon the Comacine Magistri as the parents of modern Freemasonry. Whether this be so, or whether the Comacine masons were only a link in a still longer chain of succession, there is no doubt as to the points of similarity in the Comacine constitution and that of the Freemasons.

In Leader Scott's book the connection of the "*latomi vocati fremaceons*" with the *sculptores lapidum liberorum* is touched upon without sufficient explanation as to whether they are identical, and why, if so, the adjective "*free*" is transferred from the stone to the mason.*

The veneration by the Comacine and subsequent dependent guilds of the SS. Quattro Coronati seems a special point of connection between them and Rome on the one hand and the Freemasons on the other. The Four Crowned Ones were Christian builders who, under the persecutions of Diocletian, suffered martyrdom rather than build pagan buildings for a pagan emperor. Their church at Rome, built in the time of Honorius, was, according to Leader Scott, the work of "the Comacine Masons then in Rome." It would be better if some authority had been given for this rather important statement, and also for the further assertion that the church was from early times an appointed place of meeting of the "fratres Comacini." In fact, if I may say so in parenthesis, a certain want of balance as to the relative importance of evidence is one of the few signs that the book is the work of a lady; another—and I mention this also without any insistence—is the rather random proof-correction of the Latin quotations. This matter will be easily set right in a later edition, and, indeed, it is possible that some of the apparent mistakes in transcription are in reality mediæval barbarisms. But the fact that the Latin of the middle ages is not the Latin of Cicero makes it all the more important that the transcriptions should be correct, particularly as some of them convey important evidence and are not too intelligible at their best. It would be rather ungracious to multiply instances of these *errata*, some of which may, as I say, be the slips of mediæval pens, while others have no doubt been already noticed by the author, but I have put together in a foot-note some of the expressions which I suspect of corruption.†

Having established the existence of her Comacines under the Longobard rule, and having made them responsible, with every show of credibility, for most of the famous buildings which we had been wont to term Lombard, Leader Scott's task is to prove their intimate share in the establishment of Gothic architecture (or so called Saxon and Norman architecture) in France, Germany, England, and Ireland, and further to give them credit for the conduct of Italian architecture up to and even beyond the dawn of the Renaissance; for, strange as it may seem, it is quite clear and indisputable that many of the names which we know as heroes of the Renaissance are actually found inscribed upon the rolls of the local Italian guilds which trace their origin to the brotherhood of Como.

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* In connection with this point, and with the whole subject of Freemasonry in England, I should refer the reader to the very learned article by the late Wyatt Papworth, written first in 1860–1, and reprinted in the Institute Transactions, vol. iii. 1886–7. "The term freemason," he says, "is clearly derived from a mason who worked freestone, in contradistinction to the mason who was employed in rough work." This neither tallies with the view that *free*stone is untaxed stone as distinct from marble, which was protected by a fine or royalty in certain ages, nor does it exactly coincide with the modern use of the term. It further discountenances the idea that the *freemasons* were so called from their determination (in 1375 or about that date) to work on their own terms, *i.e.* free of any restrictions but those of their own making. Mr. Papworth established 1396 as the earliest date of the use of the term "ffremaceons" in England, and appears to have disbelieved all suggestion of earlier origin in this country, though he has to admit the use of the Latin term *sculptores lapidum liberorum* in the London assize of 1212. He agrees, I think, with Professor Freeman in rejecting the theory of connection with the Roman *collegia*, which, though I am no freemason, I should for my own part like to believe and to see proved.

† Page 23: for *violenta* I should suppose *violentia*; for *erat furta*, *erant*; for *sanæ*, *sane*. Page 24: the unlikely expressions *De annonam*, *de fumum*, *de puteum* are, no doubt, accounted for by the omission of a gerund in the abbreviated transcript. Page 42: in the quotation from Paulus Diaconus the object of the sentence, presumably *ecclesiam*, is omitted. Page 44: *due* is an unconscious lapse into Italian. Page 76: for *veritatum* read *veritatem*. Page 117: for *funditos* read *funditus*. Page 157: the Malmesbury quotation is very shaky probably even in its original form, but I suspect *quos . . . veriunt* should be *qui veniunt*. Page 378: for *dandem* read *dandam*.

In the obscure inscription quoted on page 230 it seems to have been overlooked both by Leader Scott and by Cav. Tolomei that the lines are rhyming lines of the form well known in similar inscriptions. The last word before the cæsura has to rhyme with the last word in the line. This should help in the reconstruction of the last line, which has puzzled the interpreters. *Prova* to rhyme with *corona* should be *prona* (which is nonsense) or *bona* (which is possible). *Vigil K* will no doubt turn out to be *vigilat*. In the first line *laudator* should be *laudatur*.

Of course the knowledge that the Comacine Masters had a widespread influence in keeping alive the ancient traditions of architecture in times of national disturbance and artistic death is not new to the present age. Merzario himself acknowledges the opinions of earlier authorities who had owned to the force of the guild, and quotes a passage from De Quincy's Dictionary (requoted by Leader Scott, who miscalls him Quatre*mal* de Quincy) to the effect that "to them may be attributed the renaissance of art and its propagation in the Southern countries, where it marched with Christianity." Leader Scott is prepared to go further than her predecessors, and to give to the Comacines the credit of nearly all the initiation in European church architecture.

The so-called Norman architecture and its familiar features are with some probability linked on to the Comacines through Guillaume, Abbot of S. Benigne (the well known Abbey Church at Dijon), a Lombard by birth,* who was a friend of Orso Orseolo, patriarch of Aquileja, restorer of the church at Torcello, and brother of one of the builders of St. Mark's at Venice.

Here we have a whole nest of probabilities. Not only does S. Guillaume bring his own brother Italians over to Dijon to build the church which he had himself designed, thus accounting for what one may call the Cluniac group of churches in Burgundy and Le Morvan, but we have a glimpse, worked out more fully elsewhere, of the connection of the Comacines with that phase of Adriatic architecture for which in a vague way an Oriental origin has been generally assumed.

Leader Scott is nothing if not bold; not only does she claim among the Byzantine works at Venice that the Comacines were at least as much engaged as the problematic Eastern workmen, but she goes further, and, if we understand aright her hints on pp. 69 and 70, goes, Procopius in hand, to the very doors of Santa Sofia with something more than a suggestion that the men of Como were the builders there also.

I may here mention that in several of the cases where the evidence is documentary the use of the terms *magister* or *magistri* is looked upon as proof of guild work. I do not feel sure that the word need necessarily imply a master in the technical guild or masonic sense. This is a point on which certainty would be worth attaining—if attainable.

The chapter which concerns our country, and which is headed "The Origin of Saxon Architecture in England," has been written by the Rev. W. M. Barnes, the brother of the author ("Leader Scott" being a daughter of the Dorset poet). Mr. Barnes sums up his conclusions under a few brief heads which, though written independently and based on separate authorities, agree closely with his sister's argument. The Comacine guild was, he says, the survival of the Roman *collegia*, and became the centre of architectural intelligence in the middle ages. Augustine, when he came to England, brought architects and masons. There were monks associated with the Comacine guild, and therefore it would be at least the most natural thing that Gregory could do to choose these architects and masons from among the Comacines. Further, the theory is backed by allusions and phrases in Bede and in other chroniclers.

One of the most surprising developments of Leader Scott's theory of the universality of the Comacine influence is the way in which it deprives Ireland of its *Keltic* art. The knotted twist so familiar on Irish crosses is, in the opinion of the writer, no other than the Italian *intreccio*, which, call it what you will, *Girigogolo*, *meandro*, or "Solomon's knot," is the undoubted badge or sign of the *collegium*; and again, in her opinion the round towers of

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* "Born," says Leader Scott (apparently quoting from a chronicle), "on the island of Santa Giulia, in Lago di Orta, part of Lago Maggiore." But Lake Orta is not part of Maggiore, and the island in it is called San Giulio, not Santa Giulia.

Ireland, ascribed as they have been to Persians, Phœnicians, and Danes, are nothing more than Christian churches of Comacine work. Looking round for some link by which to connect Ireland with Italy, she falls not unnaturally upon St. Patrick, whose origin was undoubtedly Continental, and whose mission to the island, which looks upon him as the embodiment of Kelticism, was ordered by Pope Celestin I. Not that Leader Scott directly imputes to St. Patrick the introduction of Comacine workmen; rather it must be supposed that his followers in the ministry, Fredianus and Columban, who respectively built churches at Lucca and Bobbio, brought or sent back to Ireland the *magistri* who were to establish Christian places of worship in that country.

Germany's debt to the Comacines rests admittedly upon hypothesis. If St. Boniface visited Italy before his mission to Germany in 715, and if Pope Gregory supplied him with a retinue of mason monks; if Albertus Magnus became a *magister* of the guild, and if his *Liber Constructionum* was based on the secret *Arcano Magistero*; if, finally, there can be found any proof of masonic organisation among German builders of the early Gothic period, then the hypothesis is turned into fact. But there are a good many suppositions in the argument, and it still needs to be worried out with the thoroughness which generally characterises German research.

On Italian soil there is, of course, no difficulty in tracking the continuity of the collegiate system. The secession of the painters, which in the Sienese school took place in 1355, and in the Florentine thirty-one years later, only serves to mark the unbroken continuity among the architects. That some of the workers of the Renaissance have their names upon the guild rolls certainly proves the vigour of the *collegia* up to and into the Quattro Cento, but hardly, I think, entitles the Comacine system to claim initiative credit in the Humanist Revival. The Lombardi at Venice, Sansovino among the Florentines, Lionardo at Milan, and a host of those who worked at the Certosa—Amadeo, the Solari, and the brothers Mantegazza—are all men whose names are undoubtedly to be found on the lists of the local lodges; but this is far from being a proof that the spirit which wrought the Renaissance had its birth or even its cradle in the guild system. Perhaps Leader Scott would be glad that her readers should arrive at this conclusion, for, in spite of her generous praise of the façade of the Certosa, one detects in her pages a gentle grudge against the classicisms of the new movement, the gist of which, like a good Goth, she possibly misappreciates.

To look at her book as a whole one may perhaps say that it would have proved more if it had attempted to prove less. The vitality of the collegiate system she undoubtedly both establishes and emphasises, but in reviewing her evidences one is led to use them in a slightly different direction from that which the writer intends. Through the dark ages of art the Comacine school was the *fuoco* of architecture. When the torch was wanted, and wherever it was wanted, it was to that hearth that the light-bearers had to go. Little by little the small centre of light and warmth grew and distributed itself; fresh lodges were formed; fresh centres of the old activity, modelled on the old constitution. But if we come to ask, not whence the lights were kindled, but who did the kindling, and what force sent forward the brands that were to lighten every land, we have to answer, not the genius of Como, not even, except in the first ages, the Longobard and Carlovingian monarchs, but no less a power than the Holy Catholic Church. Como was a handmaid, a faithful *ancilla*; but if, as Leader Scott claims, and as we should like to believe, her emissaries came to England, Ireland, Germany, and France, it was the Church through her Popes, her saints, or her faithful kings who gave them alike the order and the power to go. Como, to her honour, was the chosen, perhaps the only minister; but the universality and strength of her mission was the catholicity and power of the Church.

PAUL WATERHOUSE.

A FEW NOTES ON CORNISH CHURCHES.*

By Charles De Gruchy, *Pugin Student* 1898.

THE typical Cornish church is a small, quiet, unpretentious building. It generally consists of three parallel divisions, forming a nave and two aisles, with a tower at the west end of the nave and a porch to the south aisle. In some few cases a fourth aisle has been added to form a chapel. The aisles are separated from the nave by arcades. Sometimes the nave is slightly longer eastward than the aisles, giving additional space for the chancel. The accompanying sketch-plan of the church of St. Keverne will explain the disposition of these parts [fig. 1]. It may stand for a typical Cornish plan, with the exception of the position of the tower, which is usually planned with three sides free of the church and not incorporated into the nave as here.

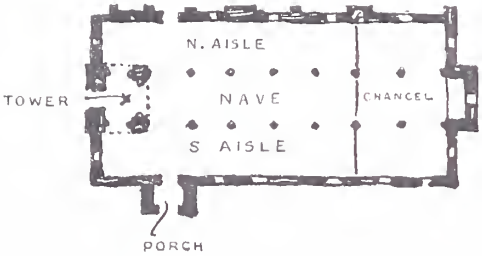

Fig. 1.—Sketch Plan of St. Keverne Church, Cornwall. About 110 feet long and 60 feet wide.

These three parallel divisions are roofed with semicircular cradle roofs, as a rule equal in height. Sometimes, however, that over the nave is a foot or so higher than the aisle ones. Therefore there is no clerestory, and the church is lighted entirely from the aisles and ends. There are only three or four exceptions to this rule in Cornwall in which clerestories do occur. The roofs are most often open, all the construction being exposed, but sometimes they are plastered between the main ribs, forming squarish panels; in most cases, however, it would seem that this plastering was done at a later date. The main ribs (occurring at every fourth rafter), purlins, wall-plates, &c., are richly carved in running patterns, and the intersections covered with large square bosses, often of very quaint design. It should be noticed that the chancel-arch is entirely omitted in Cornwall, so that the roofs run uninterruptedly for the whole length of the church. This adds greatly to the simplicity and charm of the Cornish interiors, and most of the churches being small, and having rather low roofs, a sense of homeliness and repose is the result.

It was necessary, however, to separate the chancel from the nave. The chancel floor was usually slightly raised, but, besides this, gorgeous, elaborately carved rood-screens were placed at the entrance to the chancel, and extended entirely across the building from aisle-wall to aisle-wall. The remains of these are found throughout the county—it is sad that they have been so fearfully mutilated everywhere that there remains hardly one complete. They were very often coloured and decorated with figures (painted) of saints; in fact most of the fragments left bear traces of colouring and gilding. A rood staircase was built for access to these screens, and was placed in a small turret projecting outside the aisle wall, which turret became one of the external features of the Cornish church.

The churches were nearly always seated throughout with massive oak benches, the carvings on which are no whit less fine than those of the screens [figs. 2 and 3]. The bench ends gave the carver a fine field for the display of his ingenuity and of his skill, and this was readily taken advantage of. Although many of these benches have been destroyed to make way for modern "improvements" in the shape of varnished pitch-pine abominations, many churches fortunately retain the greater part of them. There is a wonderful spirit about this Cornish carving. It is not to be denied that much of it is coarse and crude, sometimes even ill-considered; but it is so essentially human, that through it all you seem to feel how the craftsman who carved it delighted in his work, and it has that subtle quality of inspiring sympathy which is so painfully absent in most of the present-day work. How even the common everyday sights of the village are pictured in it! Look at the Altarnun bench ends, with the birds feeding on berries, the flock of sheep grazing; on another bench the shepherd is portrayed, and we have even the village jester in cap and bells. These and multitudes of other such touches reveal an amount of thought and of living interest that would be welcome amongst us to-day. A love of

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* These Notes prefaced Mr. De Gruchy's Report to the Council of his tour in Cornwall as Pugin Student 1898. The Report itself, which is deposited in the Library, occupies some thirty folios of foolscap, and includes numerous sketches, some of which are here reproduced to smaller scale. Mr. De Gruchy states that he spent three months in Cornwall, starting at Launceston on 6th June and returning from St. Austell on 2nd September. During this time he visited from fifty to sixty churches, many of which he sketched, and in two cases made complete measured drawings. The Report includes a map showing the route taken.

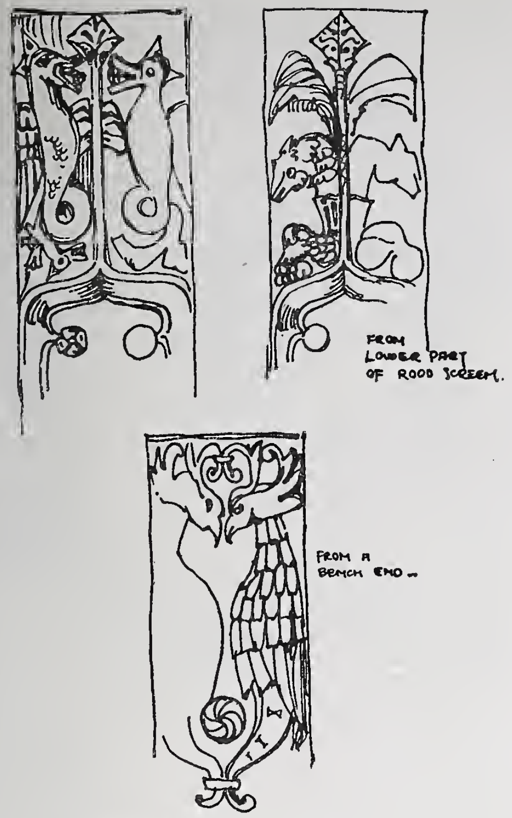

FROM LOWER PART OF ROOD SCREEN.
FROM A BENCH END.

Fig. 2.—Carvings, St. Levan, Cornwall.

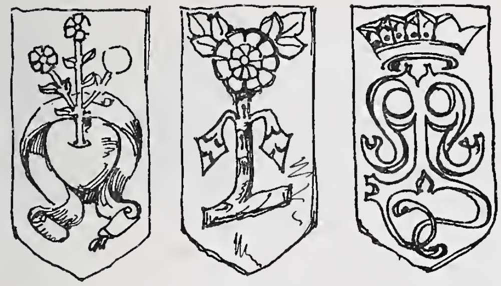


Fig. 3.—Emblems on Shields from bench ends, St. Columb Major, Cornwall.

symbolism was deeply rooted in the Cornish nature, and scattered everywhere over screens and benches we find the quaintest and most delightful renderings of the emblems of the Passion and of the saints. It is impossible not to recognise in all this carving a strong Celtic influence; the interlacing patterns of stems and foliage among which animals and birds disport themselves, the weirdness and elaboration of it all (in the rood-screens even the tracery shafts and beads and fillets of the mouldings are enriched at times) are too plainly Celtic to admit of any doubt. That the bulk of the carved work was done at a later date is also evident from the fact that many of the carvings are quite Renaissance, almost Italian in design. It would seem that all this carving was the work of guilds which travelled from place to place in the country, and one must own that there is a sameness and repetition of design, especially in the benches, which goes to bear this out. This is especially remarkable in the traceries on the bench ends—the patterns of these are few and poor, and the carvers would seem to have been rather cramped at this part of the work; it was only when at the actual carving that their ingenuity seems to have asserted itself, and panels and borders are cut with dashing freedom.

Granite was the material chiefly used in building, and, of course, lends itself to nothing so much as to massive and simple treatment. In the slate district round about Delabole, slate is very much used. Trapstones are also largely employed in some parts, and in the Lizard peninsula serpentine. The slate and trapstone occur in long narrow thin slabs, which give quite a special character to the masonry. The granite used in the Land's End district is very coarse in grain, and has nearly everywhere weathered badly, the carvings and mouldings being nearly obliterated. This material may be easily had in large blocks, and as a result even the smallest Cornish buildings attain a certain dignity owing to the size of the blocks of which they are built. Some of those I measured here and there in the walls of very small churches were as much as 6 feet long, 2 feet high, and 9 inches deep. They are as a rule used only as a facing, being bedded on their narrowest face and backed with rubble masonry inside. The largeness of the materials compared with the smallness of the church is everywhere remarkable; the piers of the internal arcades, for instance, are very often monoliths, but on account of the small size of the churches, they seldom exceed 10 feet in height, and are much more often from 6 feet to 8 feet high. It is no uncommon thing to find an arch of 8 feet span constructed of four blocks, while the smaller doorways are nearly always made of four blocks, one for each jamb and one for each side of the arch. In many cases rubble masonry is freely used both outside and inside the church, though in the

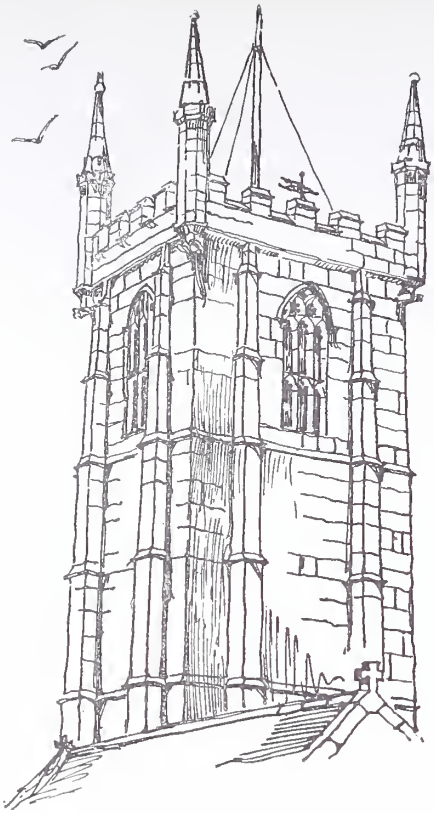


Fig. 4.—The Tower, St. Ives, Cornwall.

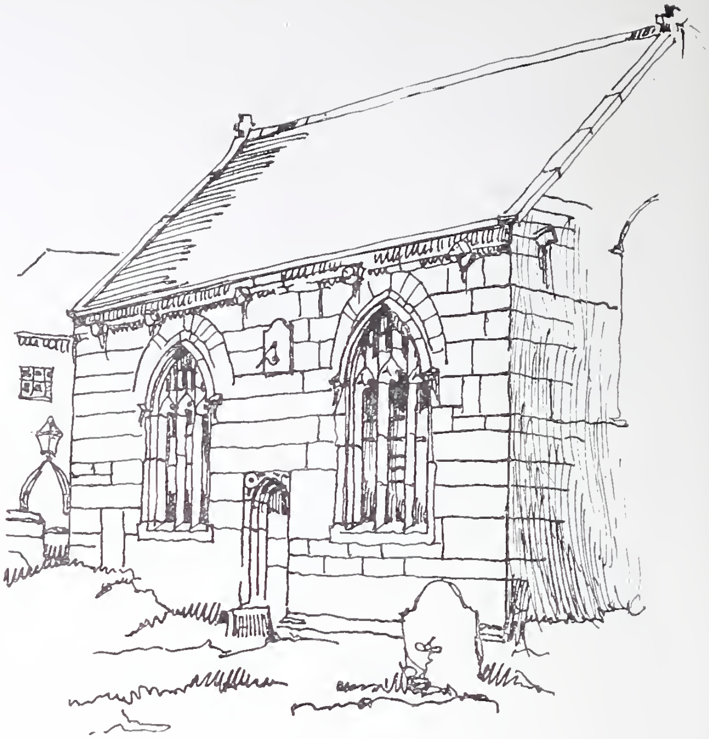


Fig. 5.—The Trenwith Aisle, St. Ives, Cornwall.

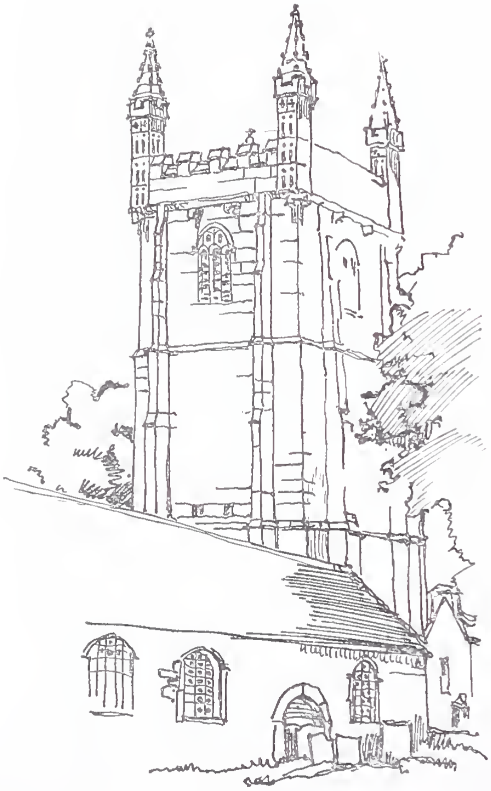


Fig. 6.—The Tower, Ludgvan Church, Cornwall.

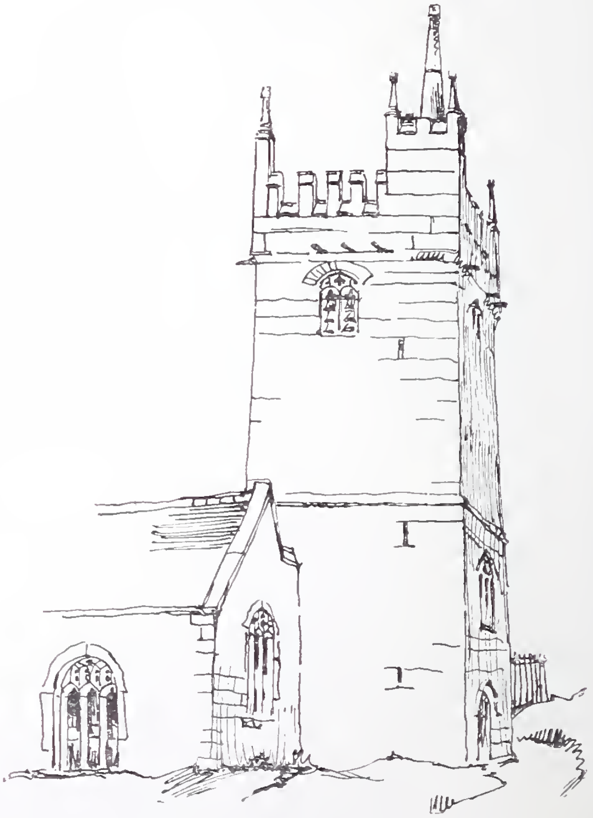


Fig. 7.—Cury Church, Cornwall.

latter case it was probably intended to be plastered; in such cases the only dressed stones are the window jambs and traceries, door jambs, piers and arches of arcades, coping stones, &c., &c.

The towers are usually very plain and massive, built of large coursed blocks, and are nearly always slightly battered inwards to the top, or set back at string courses which mark the different stages; they are not as a rule very lofty, but there are exceptions, such as St. Buryan, Probus, and St. Austell, &c. In many cases they have no buttresses; when these do occur they are placed at a short distance from the angle of the tower, and not immediately on it. The buttress courses for the most part do not range with the courses of the tower walling, so that there is a straight joint on either side, and constructionally they can be of very little use indeed. This want of proper bonding is remarkable in all Cornish work, the smaller buttresses to the porches being worse, if anything, in this respect; the object seems to have been to use the blocks of granite with as little cutting as possible. The tower most often ends in a simple battlemented parapet and four angle pinnacles, but if it has a staircase turret this is carried up slightly higher than the pinnacles, and finishes sometimes with a spirelet and sometimes with battlements. There are very few spires in the county. The tower has belfry windows, with louvres at the top stage on all four sides; at the bottom the west door opens into the nave, and above it is the west window; between these two stages there is nothing but plain coursed masonry. It is this plain, unpierced wall surface that gives such an air of dignity and solidity to the smallest of Cornish towers.

The lower stage of the tower is entirely open to the nave, the walls are of enormous thickness, and the tracery plane of the west window is generally on the outside; this leaves a very deep reveal inside the window, and from within the church the effect of this treatment is exceedingly fine. The light shining through the tracery produces a wonderful effect of mystery, and in many ways this is quite one of the finest features of a Cornish interior.

All these details, however, convey nothing but a very poor and meagre idea of what a Cornish church really is. Indeed, the architecture of Cornwall is difficult of description. Not that there is much to describe!—in point of fact, the very reverse is the case—here, if anywhere, we have perfect simplicity of motive and of result; but by mere writing and accuracy of detail it is impossible to convey a true and living impression of these wonderful Cornish churches, for the reason that so much depends on their setting. However skilful the draughtsman may be, his drawing of any one of them will probably convey an impression of baldness, even of poverty of design, especially if the memory recalls, as it invariably must do, some of those more florid examples of the Gothic style, bristling with pinnacles, crocketed and traceried, which lend themselves so readily to fine draughtsmanship. If such a comparison as this be established in your mind the Cornish church will probably suffer, but, however much this may be so in a comparison on paper, it would certainly not be the case could both the churches be contrasted *in situ*. Being in Cornwall, and studying its churches on the spot, your previous opinion will be reversed, for here things are presented in a new light, and here only can these buildings be thoroughly understood. Now, there appear to you qualities in these small structures, in this heavy granite masonry, in the simplicity of the mouldings, in the absence of ornament, the real meaning of which you had before failed to grasp. The fact is that you have begun to realise how truly and beautifully the country and its architecture are in sympathy. There is no suggestion of unfitness about the Cornish church; the building might have grown into its place, for it forms just as much part of the country as the very soil on which it stands—often *in* which it stands, for in many cases the churches are built into the hillsides, which are cut away to receive them; it would as soon occur to you to question the right of the neighbouring oaks to be there, as that of the building which they shelter. The Cornish expression, "built *into* the country," is full of a deep meaning, and expresses very beautifully the oneness of Cornwall with its old churches.

So, to describe its architecture fairly, one needs to picture this wonderful Cornish country: its weird stretches of lonely moorland, treeless and all but voiceless solitudes, instinct with a wild beauty, scored with tiny winding streams, and dotted with granite boulders—some, logan stones of mysterious attributes, or maybe giant's quoits or other relics of the oldest days. Its stately cliffs, echoing the screams of the sea-birds, piled up in shapes which rival the wildest fancy, droning in sympathy with the lazy sea, or roaring back defiance to it when it has changed its mood. The quiet caves, the sheltered beaches, the cluster of fishermen's cottages on the sea-board, the small harbour crowded with masts, the wooded valleys, each with its little stream rippling down to the sea, and separated by tracts of bare, bleak uplands where no tree grows. The winding hilly roads and lanes, most often unshaded by trees, and gleaming white in the full light of the sun, bounded by low hedges sometimes gorgeous with fuchsias in full bloom, sometimes fringed with stunted bushes forced by the winds into uncomfortable slanting positions, now and then commanding views over miles and miles of sea dotted with the sails of the fishing fleets; and always gay with wild flowers. Here and there on the road stands an old granite wayside cross, a silent reminder of time that was.

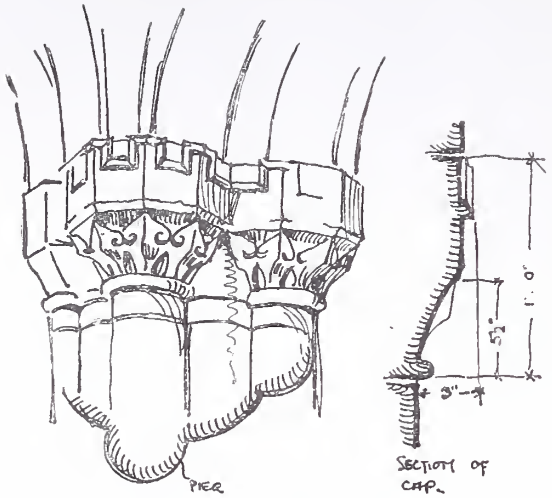


FIG. 8.—Capitals of Nave Arcade, St. Ewe, Cornwall.

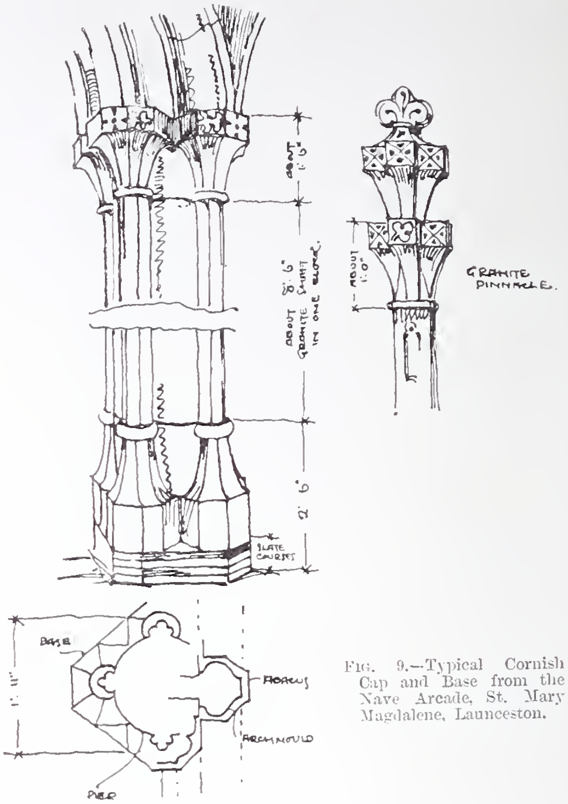
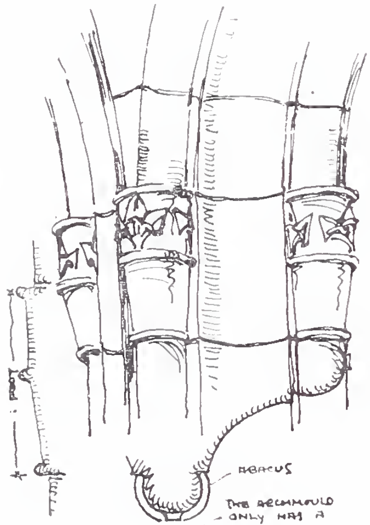
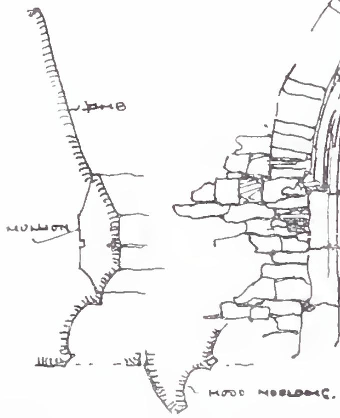


FIG. 9.—Typical Cornish Cap and Base from the Nave Arcade, St. Mary Magdalene, Launceston.





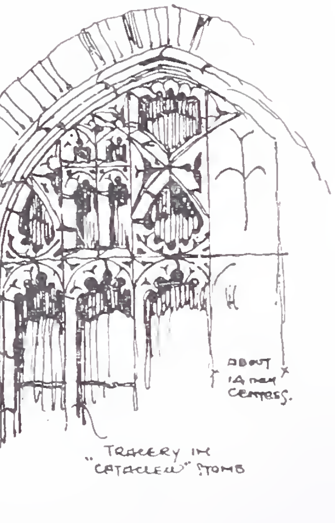


FIG. 10.—Caps in Choir and Tracery at West End, St. Mawgan in Pydar, Cornwall.

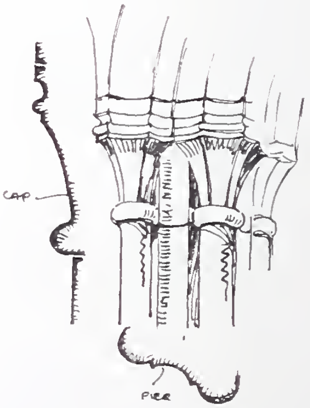


FIG. 11.—Caps of Nave Arcade, Mullion Church, Cornwall.

But no description of the present writer can convey the attractiveness of this country. It is in places rugged, forbidding, and wild; in others smiling and homely—and all this is in its architecture too. Without doubt the master-quality of these old buildings, that in them which makes them live to us, the keynote of all their music, is their perfect harmony with their surroundings—they belong to Cornwall, and are inseparable from it. You cannot divorce them from mother soil and yet hope to understand.

I feel that here, more than anywhere else, you are brought into close touch with the soul of the old builders. Their honesty is transparent, and in this age of shams such a teaching of truth as they offer has a boundless value. A thorough study of their work should do much to teach the value of honesty and of frankness in building. If this principle could be rooted in the soul of the modern architect in such measure as it was possessed by the builders of old Cornwall, it would revolutionise our modern work, the great mass of our architecture would cease to be transparently dishonest, and men would be honoured for having built truthfully rather than for having built elaborately and at all costs made a show.

The great simplicity of Cornish work has been attributed principally to two causes:—First, the intractability of materials, the granite chiefly used being unsuited to fine carved work or elaborate moulding; and secondly, the remoteness of the county and its difficulties of access and of travel, which, in the middle ages especially, must have prevented new ideas from spreading as quickly as elsewhere, leaving the Cornishmen very much to their own resources. These reasons are in a great measure good ones, but it seems to me that the character of the people has not been sufficiently taken into account. They are a race apart, these Cornish—hardy and rugged like their country, open-hearted, whole-souled men, never cringing or overbearing, but always courteous, true gentlemen every inch; and to me the simple, honest Cornish church tells more of the simple, honest Cornish hearts who conceived and built it in the old days, than of difficulties of material or communication. I am the more inclined to this belief for noting that here, as elsewhere, the work of the principal Gothic periods is distinctly marked. There is a very little Norman, and not much more Early English or Decorated work to be found, the great bulk of it being Perpendicular; but at all events the styles are distinct enough, so that evidently new ideas did penetrate in spite of difficulties of intercourse. But although there is no mistaking the date of the work, the Perpendicular of Cornwall is characteristic in every sense—it bears its own hall-mark and could never be passed as other than Cornish. As a further argument, the Probus tower is an example of a foreign influence in the county—it is practically a Somersetshire tower; and although it is of great beauty, and so elaborate that, especially in those days of plain builders, it must have been talked about far and wide, it seems to have exerted no influence whatever on the buildings of the immediate neighbourhood, and it is so much a stranger that the feeling is one of wonderment at meeting with it in that part. That elaborate work in granite could be done is proved by this tower itself; and if with this fine example before them, in their very midst, they refrained from imitating it in any way, it must be that they would not; in fine, it was not akin to their character.

To this day the Cornish preserve marked characteristics, in nothing perhaps so much as in their open-heartedness. The hospitality of the West is proverbial, and nowhere, I am sure, is it better illustrated than in Cornwall. The memory of a delightful three months' tour in the county is made all the pleasanter to me by the recollection of many kindnesses received at the hands of complete strangers. But as a tribute to Cornwall and its people what can be finer or truer than the following lines of Arthur Christopher Benson's:—

O generous hearts, brave spirits of the West,
  Clear-sighted, open brow, and open hand,
  Wise, wistful, laughter-loving, fearless band,
So swift to clasp the stranger to your breast,
So faithful to remember; ye are blest,
  Who 'twixt the bleak moor and the blowing sand
  Live hardly, love your frugal mother-land,
Can toil, and, rarest gift of Heaven, can rest!

So ordered He, who made you shrewd and brave,
  And bade your myriad streamlets blithely run,
  And knit the marble promontories, and nursed
  A sacred race, and bade them know the first
Kiss of the stately landward-marching wave,
  And latest flash of the ocean-dipping sun.

9, Conduit Street, London, W., 30*th Sept.* 1899.

CHRONICLE.

The Standing Committees.

The officers of the Standing Committees for the new Session have been appointed as follows:—

Art.—*Chairman*, Mr. Alfred Waterhouse, R.A., LL.D.; *Vice-Chairman*, Mr. J. Macvicar Anderson, F.R.S.E.; *Hon. Secretaries*, Messrs. Ed. W. Mountford and Henry T. Hare.

Literature.—*Chairman*, Mr. R. Phenè Spiers, F.S.A.; *Hon. Secretaries*, Messrs. Arthur S. Flower, M.A., F.S.A., and R. Elsey Smith.

Practice.—*Chairman*, Mr. J. Douglass Mathews; *Vice-Chairman*, Mr. S. Flint Clarkson; *Hon. Secretaries*, Messrs. J. Osborne Smith and C. H. Brodie.

Science.—*Chairman*, Mr. William C. Street; *Vice-Chairman*, Mr. Lewis Angell, M.Inst.C.E.; *Hon. Secretaries*, Messrs. H. D. Searles-Wood and Max. Clarke.

Dr. Murray's Excavations in Cyprus.

An early evening in the approaching Session will be devoted to a Paper by Dr. Murray entitled "Decorative Patterns from Excavations in Cyprus in 1896," in which the author will give some account of the archæological treasures brought to light during his excavating expedition to Cyprus for the British Museum in the spring of 1896.

The University of California.

News has been received in Paris that, as a result of the final competition for the Phœbe Hearst Architectural Plan for the University of California, selection has been made of the designs of M. Henri Jean Emile Bénard, a French architect, to whom the jury have awarded the first prize, 10,000 dollars. The four other premiated designs in the final competition are by the following: (1) Messrs. Howells, Stokes & Hornbostel, New York—2nd prize, 4,000 dollars; (2) Messrs. Despradelles & Codman, Boston—3rd prize, 3,000 dollars; (3) Messrs. Howard & Cauldwell, New York—4th prize, 2,000 dollars; (4) Messrs. Lord, Hewlett & Hull, New York—5th prize, 1,000 dollars. M. Bénard, the author of the selected designs, is fifty-five years of age, and in 1867 won the Grand Prix de Rome. It is stated that the buildings are estimated to cost 40,000,000 dollars.

The Clergy and Artists' Association (for the Improvement of Art in Churches).

Mr. Holman Hunt, in the *Contemporary Review* for January 1897, referring to the above Association, then recently formed, wrote:—"What gives new hope for the generation to come is that ecclesiastics have arisen with a new sense of the value of living art. A number of artists have thought it high time to combine to denounce the prevalent taste, and to strive to serve religious thought with designs of original conception; and they have formed the Clergy and Artists' Association." The objects of the Association are to enable the clergy and others to approach the artist more directly; to undertake, through its members, decorative work in churches; to restore the individual character to art in churches through the direct employment of the artist; and to counteract the evils of delegated work, and of commercial and mechanical production. In furtherance of their work an exhibition is held yearly by the Association at the time of the Church Congress.

This year the exhibition will be held in the studio at Leighton House (the residence of the late Lord Leighton), Holland Park Road, from the 9th to the 13th October inclusive. The exhibition will include, in addition to the examples of work executed under the auspices of the Association and by its members, representative examples of the work of individual artists and craftsmen working in churches. The Arab Hall and the collection of sketches and studies by the late Lord Leighton will be open to visitors to the exhibition. A meeting of the Association will be held at Leighton House during the Church Congress week, at which the Bishop of Rochester, one of the patrons, is to preside. Mr. Reginald Hallward, is Hon. Secretary, and the offices are at 6 Millbank Street, Westminster.

Obituary.—William Willmer Pocock [*F.*] and James Hewitson Shaw [*A.*]

In Mr. W. W. Pocock, who died on the 18th inst. in his eighty-sixth year, the Institute loses its oldest member. Mr. Pocock joined as an Associate in the far-off days of 1837, and proceeded to the Fellowship in 1846. In 1838 he won the Institute Silver Medal (Essays). His chief architectural work was the original Spurgeon's Tabernacle, destroyed by fire in April of last year. One of his latest works was the Hall of the Carpenters' Company in Throgmorton Avenue.

The death is also regretfully recorded of Mr. J. H. Shaw, *Associate*, elected in 1895. Mr. Shaw was for five years assistant, and for six years chief, architect to the Anglo-American Oil Company, for whom he carried out some very creditable work.

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